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Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Are we "Sold" Ourselves? Let us Start the Year Right

An investigation was recently carried out by the Merchandising Division of the Commercial Section of the N.E.L.A., New England Division, to ascertain the extent to which employees and officials of the member companies are using appliances of various kinds. Replies were received from 45 companies reporting upon 218 officials and 6,492 other employees—a total of 6,710.

From the results it appears that the officers and employees of electrical companies are not themselves sold on the value of electrical appliances and, from the figures submitted, it is no wonder if they are not able to make sales to the general public. If a salesman has not sufficient confidence in the merits of a toaster or iron to install one in his own home it is extremely unlikely that he can arouse the necessary enthusiasm in his customer. It is a case that seems to fit the Scriptural admonition that we must first remove the mote from our own eye before we can see clearly enough to remove it from the eye of others.

In a study of the figures representing 6,710 electrical homes it is shown that only 2,941 own electric irons—only 44 per cent; toasters are used by 1,661 homes—a little less than 25 per cent; vacuum cleaners show the same results as toasters—25 per cent; 18 per cent use fans; 12 per cent use electric washers; 4 per cent use electric ranges, and so on down the list.

If this represented the percentage for the total inhabitants of those towns and cities it would be nothing for the electrical industry to be specially proud of.

We can't say whether these percentages would apply to Canada. Possibly Canadian figures would be somewhat better; we have many reports, for example, of more than 44 per cent of the total household population using electric irons. It will be remembered, however, that the statistics we gave some time ago regarding the general use of appliances indicated that an unbelievably large percentage of our people don't use them as they should.

There is a very real lesson to be learned from these figures, however. We would suggest that every electrical company, whether manufacturing, jobbing, contracting or merchandising, would do well to take an inventory of the electrical equipment in the homes of their employees to see how far the "Do it Electrically" idea has sold itself to the men themselves whose life work it is to sell it. There is no other selling argument that carries so much weight as "I know from my own experience." It looks as if the N.E.L.A. had exposed one of the real weaknesses of the electrical industry.

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Conciliation Board Recommends Wage Reductions

In the application of the B. C. Electric Railway Company for a reduction of wages to employees, alteration of working conditions, abolition of extra pay to motormen and conductors for Sundays and holidays, and for definition of wages and conditions governing the operation of one-man cars, the Board of Conciliation appointed to consider the application, has handed down its findings. The report, which has been released for publication by the Hon. the Minister of Labour for Canada, is not a unanimous one. The majority report, signed by Mr. W. C. Ditmars, chairman, and Mr. A. G. McCandless, company's appointee, finds in favor of the company on the question of the wage reduction and the cutting out of overtime, as well as in altering working conditions. The majority does not, however, recommend the full demands of the company, holding that the present is not an opportune time to make such drastic changes. The minority report handed in by Mr. R. P. Pettipiece, does not agree with the amount of the decrease to be granted.

After reciting the numerous meetings held, and evidence submitted, the majority report recommends a general reduction of ten per cent in all wages, with exceptions later mentioned. After expressing strong opposition to the principle of overtime for work on Sundays and holidays in operating cars, because such work is necessary to the operation of an industry giving continuous service, the majority report recommends that time and a quarter for Sundays and time and a half for holidays be made the new basis. Another recommendation was that extra men be guaranteed a minimum monthly earning of $87.50 instead of the present guarantee of six hours work per day. Spread-over time, arising out of runs not being completed within ten hours, is recommended to be paid at 10 cents per hour, instead of 25 cents, additional to the regular pay, as at present. Reporting time to be paid according to schedule running time between nearest office and relief point, is another recommendation, which would also eliminate extra box time now allowed. For shop men, overtime is recommended to be time and a half except that when men are required to work more than five hours overtime, after having already worked eight hours at straight time, they shall be paid double time for all time worked in excess of such five hours. For the one-man cars that the company proposes to instal on certain lines, the majority recommends that men operating them shall be paid 10 per cent

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in excess of the proposed schedule, owing to the greater responsiblity attached.

Minority Report Recommends Less

Mr. Pettipiece, representing the employees, in his minority report does not specifically fall in with the findings of the majority on revised working conditions but does so tacitly. His recommendation of a 5% reduction in wages would, he figures, with the reductions in overtime, and changes in working conditions, make a total actual reduction of 12 per cent all round. That, he comments, would, in his opinion, have been an ample reduction for the Board to make at the present time. As the chairman did not agree with his view, Mr. Pettipiece submitted his minority recommendation.

It is stated by officials of the company that the majority report of the board will be accepted by the company, though it did not concede the full demands. It was remarked that the award definitely stated the majority opinion that the company was justified in asking for a fifteen per cent reduction, although only 10 per cent has been recommended. The decision of the men awaits the outcome of meetings of the various locals of the union at which the two reports will be considered. It is not anticipated that any strike action is likely to follow.

Election Returns by Wireless A Welcome Improvement on Billboards

Election returns by wireless—in your own easy chair? Of course! It is the modern method and the best one yet found. Through the kindness of a local company who own and operate a powerful wireless telephone a wonderfully complete election service was rendered on the evening of December 6th to all Toronto amateurs who cared to tune in their wireless receivers and listen for the returns.

Those who stood for hours in the crowd before bulletin boards or sheets on which figures, names and cartoons were being flashed will doubtless be interested in the wireless method. Its speed exceeds that of the bulletin board, and you can get all the information you want right in your own home and entertain your friends with the results.

It is probable that 500 homes in Toronto alone received returns by wireless, but if it is an advantage to city folks think what it means to farmers or villages and towns at a distance from headquarters.

As one instance of the way it worked out on last Dec. 6, the Anglican Young People's Association of St. John's Church, Weston, Ont., decided to have a wireless entertainment and announced that election returns would be received by wireless.

A temporary aerial was swung between two trees outside the place of meeting, a valve detector and three-step amplifier was installed and the current from the highest step operated a Magnovox which spoke right up and gave the information to all of the one hundred and fifty persons who formed the audience. It is hard to tell whether election interest or wireless curiosity brought out the crowd, which consisted of voters from all over town as well as the non-voting members of the Association. However, they were there and heard, for the first time, a human voice which by wireless had crossed several miles of country.

The service was so fast that there was not any time for music between the announcements, but election returns were the most important matters that evening, and with the different views represented and comments passing back and forth in the audience all those present enjoyed this novel means of entertainment.

How much better was that for the audience than standing before the bulletin boards and then wending their way home at midnight over miles of bad roads?

Government Telephone Commissioner Addresses Members of Manitoba Electrical Ass'n.

"Good service generates the desire to use the service more."

This is the policy which underlies the administration of the Manitoba Government Telephones, according to Commissioner J. E. Lowry. Mr. Lowry addressed the Manitoba Electrical Association on Thursday, the 10th Nov. and in addition to describing the work of the Exchange, spoke of the desire which imbued all telephone employees to give courteous and efficient service. The occasion recorded the largest attendance that has been present at an Association meeting.

Mr. Lowry had demonstration equipment and apparatus to illustrate his talk. Before going into the technical operation of the phone system, however, he made a few references to the "service" given customers.

"The service in Winnipeg cannot be considered as bad," he said, "when one considers that approximately half a million calls each day are handled. The average duration of these calls is 1½ minutes. If one man or woman were to talk into a telephone continuously, 24 hours a day, for 365 days a year, for 37 years, he or she would have equaled the amount of time taken up in phone calls in Winnipeg in one single month. In other words, the phone time consumed by Winnipeg subscribers in talking during one month of 26 working days equals the continuous use of one phone over a period of 37 years.

"We have in Winnipeg practically the last word in automatic telephone apparatus."

Mr. Lowery very lucidly explained the complexities of the phone system, and demonstrated the workings of the automatic system, showing how efficient and time-saving it was over the manual system. He showed how easy it was, too, for errors to be made, and how great and insistent was the effort of the department employees to eliminate errors and cause for complaints. The audience dispersed with a feeling of keener appreciation of the efforts being made to give Winnipeg the "best phone service possible."

New Power Unit at White Rock

The Gaspereau Light, Heat & Power Co., Ltd., have recently placed contracts for the installation of a new power unit to be installed in their White Rock, N. S., plant. The prime mover will consist of an S. Morgan Smith horizontal water turbine with a nominal maximum output of 150 brake h.p., coupled to a Westinghouse, 125 kv.a., 3-phase, 60-cycle, 2,300-volt, alternator, with direct-connected exciter. This unit will add about 50 per cent to the present station capacity when operated in parallel with the main unit already installed, but its chief purpose is for operation during the off-peak period under light load to insure higher station efficiency and resulting economy in the use of water power during dry periods when the river flow requires to be augmented from storage.

This work is in charge of Mr. Kenneth L. Warren, consulting engineer, who states that this plant, when completed, will be one of the most compact, dependable and efficient hydro-electric power stations, for its size, in Nova Scotia.

The Ontario Gazette announces the incorporation of the Matachewan Power Company, Ltd., with a capitalization of $1,000,000. Head office, Toronto. It is understood this company will develop water powers on the Montreal River, in the Matachewan area, Northern Ontario.

Winnipeg Hydro Starts Survey Work at Slave Falls, Man.

The Winnipeg Hydro Electric System have a gang of men making a survey of the power site at Slave Falls, which is situated four and one half miles from their present plant at Point du Bois. Following the policy of the Department to keep their supply of power well ahead of the demand, Mr. J. G. Glassco requested the city council to go ahead with the survey. It is expected the work of survey will extend over two or three years.

By undertaking this work early, and taking plenty of time, considerable saving will result in the ultimate expenditure. Mr. J. A. McGillivray, who was engineer-in-charge of the Point du Bois extension, is taking charge of the present operatons.

Construction Advantages

There are a number of features which make Slave Falls the logical point for the next power development on the Winnipeg river. As general examples the following are given.

In all hydro-electric developments the cost of transportation facilities and equipment forms a considerable portion of the total cost. With a comparatively negligible expenditure, the Point du Bois railway track will be extended to Slave Falls, thus providing an excellent railway connection to the site of the new power house from the Canadian Pacific Railway.

Excellent gravel pits, already opened anl provided with spur trackage are situated within four miles of Slave Falls. With the material for manufacturing the concrete so close at hand the cost of the power house building and river dams will be a minimum.

Point du Bois and Slave Falls are situated so closely together that both plants will be operated together as one large power house. Hence it will only be necessary to increase the Point du Bois staff just sufficiently to operate a combined plant of approximately 170,000 h.p.

Electrical energy for operating the machinery used in the construction of the Slave Falls plant will cost practically nothing, as it will be transmitted the short distance of four miles from the Point du Bois power house on a steel tower line which will be eventually used for the necessary electrical tie between the two power houses.

Operating Advantages

It has frequently been stated that the new power development at Slave Falls can only be operated satisfactorily in conjunction with the existing power house of the City Hydro. There are several reasons why this is so, and it is not difficult to predict accurately the unfortunate condition that would exist if the two power sites were not combined to form one large development.

In order that the Point du Bois development may be economically operated it will be necessary at certain times of the year that all the water flowing down the river be made to pass through the power house turbines. Hence within certain limits, the amount of water flowing from Point du Bois to Slave Falls will depend on the amount of electrical load which the Point du Bois power house is carrying.

A sudden reduction of the load at Point du Bois can therefore seriously diminish the amount of load that the Slave Falls power house might carry. The natural flow of the river at these times would be held back at Point du Bois for filling up the large pondage area above the power house. In the meanwhile Slave Falls would have to patiently wait for Point du Bois to carry more load or for the regulating dams to overflow.

In a similar manner it would be possible for the Slave Falls power house to interfere considerably with the efficient operation of the Point du Bois plant. This condition would occur if the amount of load on the Slave Falls caused the elevation of the water between the two power houses to be too high for the most efficient operation of Point du Bois.

It can thus be demonstrated that the highest efficiency in the use of these two falls is obtained by controlling the ratio between the head at Point du Bois and the head at Slave Falls. As the head at each plant bears a certain relation to its load, it follows that the load at the plants must be kept in certain relation to each other to obtain the desired result. At the time when both plants are working at their maximum output, for every horsepower generated at Slave Falls, there should be a corresponding load of one and three quarters horse power at Point du Bois.

The manner in which one development can interfere with the operation of another development on the same river depends to a great extent on the distance between the two plants under discussion and the pondage area between them. With a limited pondage area such as that between Point du Bois and Slave Falls the interference can be considerable, while with plants located forty or fifty miles apart there is not much chance for interference provided the elevation of the dams at the up-stream power house is definitely fixed by some authority such as the Dominion Government.

Automatic Telephones on Pacific Coast

The Northern Electric Company recently installed a private automatic telephone exchange in the large pulp and paper plant of the Powell River Company, at Powell River, B. C. The P. A. X. (Private Automatic Exchange), installed, is known as the "step by step" type of equipment. It provides for 125 individual lines and common equipment to which 75 lines can be added as required. The power plant consists of motor generator set, storage batteries and power board, equipped with automatic charging switch, ringing machine, automatic circuit breaker and the usual equipment found on an up-to-date power board. Both mill and townsite are now provided with excellent service 24 hours a day, without attendant operator. This "peps" up the organization for night and day operation by giving uniform service at speed and accuracy not attainable by manual operation.

Wiring is provided in the equipment for special features or services which can be added to further increase the efficiency of the plant. Some of these automatic services are "The Night-Watchman Service," wherby telephones in daily use and suitably located are detailed for watchman stations; the watchman on his rounds simply raises the telephone receiver which operates time recording equipment at the central office, thus making a permanent record of all calls. The "Conference" service provides equipment which permits the head of the organization to hold a round table conference by telephone. Each party summoned to the conference calls a predetermined number which connects him with the conference wire. The "Code Call" service locates persons who are about the plant but not at their desk. By dialing the code call number of the person wanted, buzzers, bells, horns, or whistles in various parts of the plant sound the code and the person wanted steps to the nearest telephone and dials a number which will connect him with the party originating the call. Telephones are equipped with a dial by which all the various services are controlled and operated, and a pair of wires connect each telephone to the central office equipment. This installation, while the first of its kind in British Columbia, indicates that telephone development is keeping abreast with the advance of things electrical on the Pacific Coast.

A Central Heating Plant in a Western Town

By M. D. CADWELL

Superintendent of Utilities, North Battleford, Sask.

Central steam heating was first introduced into commercial circles in North Battleford in the summer of 1916 when a steam main was laid from the power plant to the new public library which was built that year, located on Main street 750 feet distant. The service was so successful that it was decided to extend the system to serve the business section of the city after the close of the war, provided ways and means could be arranged to finance the initial cost of the installation.

A very comprehensive research was conducted by the writer, for a period covering nearly four years, relative to the merits of central heating and its adaptation to conditions prevailing in North Battleford.

Finally, in the summer of 1920, it was decided that the proposed installation would prove advantageous and profitable to the community and the city council signified its willingness to proceed at once with the installation, provided the patrons would finance the cost of same. An advance deposit, representing the fixed figure on a unit basis, and proportional to the requirements of each consumer, was agreed upon and tenders were called for supply of necessary material.

A portion of the installation was made in the Fall of 1920, but, due to the lateness of the season, less than ten consumers received service during the season of 1920-21.

Meanwhile, materials were received from time to time and in the spring of last year, practically all supplies requisite for the completion of the system were on the ground prior to the date on which excavation could be commenced.

By the end of September last, consumers were receiving steam service and installation of the distribution system was completed.

The popularity of the service and the ever increasing demand for steam, necessiated the installation of a new and larger steam main to supplement the original to a point opposite the public library, from which point the main distribution system was commenced in the Fall of 1920. This installation has recently been completed and has been operating since November 26th last.

The complete installation now comprises over 5000 lineal feet of piping arranged as below:

Under Ground Mains

743 lineal feet of 12 inch pipe
270 lineal feet of 10 inch pipe
326 lineal feet of 8 inch pipe
920 lineal feet of 5 inch pipe
1218 lineal feet of 4 inch pipe
90 lineal feet of 3 inch pipe
56 lineal feet of 2½ inch pipe

Under Ground Services

131 lineal feet of 4 inch pipe
407 lineal feet of 3 inch pipe
522 lineal feet of 2½ inch pipe
147 lineal feet of 2 inch pipe
98 lineal feet of 1½ inch pipe

Under Ground Drains

94 lineal feet of 1½ inch pipe
55 lineal feet of 1¼ inch pipe

5077 total lineal feet.

Practically all under-ground piping is of genuine wrought iron, a considerable portion of which was imported as it is not made in Canada above certain sizes.

All piping is thoroughly insulated and enclosed in circular casing manufactured in the City of North Battleford and every lineal foot has been graded with an engineer's level, and all lines were set with the transit.

Complete and perfect drainage has been provided for all piping placed below the ground level. The estimated life of the plant is 50 years.

The total cost of the system, as installed, approximates $35,000, and has been financed by the patrons of the plant in addition to certain lines of credit which were arranged with two of the firms who submitted the lowest tender for a considerable quantity of the materials required.

The complete system was designed by the writer and was installed by the employees of his department under his personal supervision.

There are now upwards of 40 consumers, and this figure will exceed 50 in the near future.

During the recent inclement weather, upwards of seventy five tons, or 150,000 lbs. of steam were delivered to the patrons every twenty four hours.

Exhaust steam from the generating units at the power plant is used as the source of heat.

While the City of North Battleford now owns and operates a comprehensive and ideal central heating plant, the first municipally owned plant in Canada to date, it has not cost the rate-payers a single farthing and is greatly augmenting the revenue from the utilities.

Meanwhile, the operation of this new utility is being watched by engineers and other interested municipal offiials from coast to coast, and it is sincerely hoped that the results obtained by this municipality, will in the near future, justify similar installations elsewhere, and that the comfort and convenience now being enjoyed by the patrons of the North Battleford heating plant may soon become the privilege of many in other urban centres.

Carrier Telephony Developments

By MR. H. J. VENNES

Before the Northern Electric Engineering Society

As a consequence of the rapid development in the art of telephonic communication, it is not surprising that the public, or even those engaged in other branches of the electric industry, are hardly acquainted with the new development, "Carrier Telephony." In general, this development makes it possible to carry on two or more conversations and a telegraphic message simultaneously over one circuit.

Mr. Vennes said that Carrier Telephony is a very broad subject and that it was impossible to cover the entire field adequately in a single lecture, but he wished to point out a few of the factors that have been responsible for the developments and progress which have been done in this field of communication. The possibilities of multiplex transmission were conceived a long time ago, some of the ideas dating back as far as 1890 and since that time various theories have been proposed giving various methods for obtaining several simultaneous conversations over a single telephone line. Until very recently, however, no apparatus has been available which would make carrier telephony a practical realization. The first actual demonstration of this kind was made by Major-General Squier in 1911 when he conducted a multiplex transmission test between Baltimore and Washington. He had at his disposal one of the few high-frequency generators which were available at that time, this being an Alexanderson high-frequency alternator. This apparatus was very elaborate and expensive and could not be considered as being adaptable to the commercial field where carrier telephony should actually be applied.

During the next few years a considerable amount of progress was made in the telephone art in the establishing of the transcontinental telephone line for the 1915 Fair which was held at San Francisco. This development resulted in the perfection of the vacuum tube, a device which has come to be of great importance in carrier telephony. About the same time a practical demonstration in radio telephony was also made upon radio telephone messages which were sent out from Arlington and which were heard as far away as 6,000 miles. This demonstration showed the possibilities of using the vacuum tubes for the generating of high frequency currents and also for combining or modulating the voice current with high frequency current so that the former could be transmitted as a radio current.

Over Ordinary Telephone Lines

As a result of these developments and demonstrations the attention of telephone engineers was directed towards the possibilities of transmitting these high frequency currents over ordinary telephone wires thereby reducing the amount of power which would be needed and consequently reducing the cost of the equipment . However, before any apparatus could be built, it was necessary to investigate the characteristics of the telephone lines on transmitting these frequency currents. It was necessary to determine what frequency ranges should be used since the vacuum tube had solved the problem of generating alternating currents of any desired frequency; consequently it had to be decided which range of frequencies could most economically be used. The experimental data which was obtained showed that the attenuation or losses in the telephone line when high frequency currents were transmitted increased very rapidly as the frequency was increased and that approximately 30,000 cycles appeared to be the upper limit of frequencies which could economically be used for carrier telephone transmission. Experimental apparatus was then built and practical tests carried out which were very successful. The first real commercial installation was made in 1918 when a four channel carrier telephone system was put into operation between Baltimore and Pittsburg. Since that time many more installations have been made and all are giving very satisfactory results.

One Installation In Canada

Mr. Vennes stated that a carrier installation has also been made in Canada this summer. The system in now installed and operating very satisfactorily between Calgary and Edmonton. This is the first commercial installation outside the United States.

Carrier Telephony depends on three major factors,—

1. The generating of a high frequency current.

2. The combining or modulation of this high frequency current with the voice.

3. The selecton at the distant end of the high frequency current which pertains to any particular channel.

The first two operations are carried out by the vacuum tube and the third is accomplished by the use of what are known as wave filters. The principal thing to be borne in mind when dealing with modulation of a high frequency current by the voice is that two new frequencies are produced. These are the carrier frequency plus the voice frequency and the carrier frequency minus the voice frequency. In other words, the voice frequencies are shifted up in the frequency scale and are really converted to a high frequency current which have the voice characteristics impressed on them. These currents are then transmitted to the distant end where they are selected into their proper channels and again passed through into a circuit where the original voice currents are reproduced. Thus, by combining various voice currents with as many different high frequency currents we would then actually have the conversation of several parties transmitted as a different high frequency current and each one can be separated out at the distant end.

Wave Filters

The wave filters in carrier telephony are of three different types. One type is known as a low pass filter, and will permit of all currents below a given frequency to pass. The second type is known as a high pass filter and will permit currents of all frequencies above a certain point to pass. The third type is known as a band filter and will permit frequencies within two given limits to be transmitted. The band filters are used for separating the current for each individual channel and the high and low pass filters are used for separating all the carrier currents from the ordinary voice and telegraph currents which may be transmitted over the telephone line simultaneously with the carrier currents.

Mr. Vennes, at the conclusion of his address, referred to several charts. One of these gave a very clear idea of what a complete carrier current telephone circuit involves. He traced the actual transmission through this system so as to show where these various operations actually take place. An interesting chart was used to explain the theory and the varied functions of the electric valve. Still another chart showed the ranges of frequency used for carrier purposes, the voice frequency and the telegraph frequency.

Canadian Electrical Association, Montreal Section

On December 19 a Montreal Section of the Canadian Electrical Association was formed at a meeting held at the building of the Engineering Institute of Canada. Mr. Julian C. Smith, vice-president of the Shawinigan Water & Power Company, and president of the Canadian Electrical Association, was in the chair. He outlined the objects in forming the Montreal Section. The headquarters of the Association, he pointed out, were in Montreal and it was, therefore, fitting that a Section should be located there. The Section would be a benefit in the direction of mutual assistance to the members; it would also result in extending the activities of the parent association, while the reading of papers on subjects of interest to the members would prove beneficial.

Mr. P. T. Davies, Southern Canada Power Co., was elected chairman; Mr. J. W. Pilcher, Canadian General Electric Co., vice-president; and Mr. E. Vinet, Shawinigan Water & Power Co., secretary-treasurer.

The program committee is composed of Messrs. L. A. Kenyon, Montreal Light, Heat & Power Consolidated, chairman; A. Lee Jones, Canadian General Electric; A. J. Soper, Northern Electric; George K. McDougall, consulting engineer; Charles F. Medbury, Canadian Westinghouse; George R. Atchison, Southern Canada Power, and W. A. Bunyon, Shawinigan Water & Power.

The following are the members of the Membership Committee: Messrs. M. K. Pike, Northern Electric, chairman; E. Playford, Canadian General Electric; A. Anderson, contractor-dealer; P. S. Gregory, Shawinigan Water & Power; H. C. Haskell, Southern Canada Power; G. A. Wendt, Canadian Westinghouse; and W. O'Brien, Montreal Light, Heat & Power Consolidated.

A large number of films were shown at the conclusion of the formal business. These were: "Back of the Button," loaned by the National Electric Light Association; "A Square Deal for his Wife," loaned by the Western Electric Company, and a number of pictures showing the water powers of Manitoba.

World-wide Power Development

All Parts of the World Involved in an Unprecedented Investigation of the Value of Water Power Resources—Uses of Hydro-Electric Energy Rapidly Increasing (Continued)

By Prof. A. H. GIBSON, D. Sc., before the British Association.

The figures already quoted indicate that the scope for inland water power development throughout the world, and more particularly throughout the British Empire, is likely to be large for many years to come, and it is gratifying to know that British engineers are prepared to play a large part in such development work.

The utilization of this water power is likely to give rise to some economic problems of interest and importance. When industrial conditions have again become stabilized, the competitive ability of the various nations will depend largely on economy in the application of energy to production and transportation, and the possession of cheap water power is likely to counterbalance the posession of such resources as coal and iron as a measure of the industrial capacity of a nation.

While it is probably true in industrial communities that the most attractive water power schemes have already received attention, many of those available in countries which have hitherto been non-industrial are capable of extremely cheap development and will certainly be utilized as soon as a market for their output can be assured.

It is in such countries that the result of these developments is likely to be most marked, and will require most careful consideration. Thus the hydro-electric survey of India now being carried out by the Indian Government indicates that very large water power resources are available in the country, and that, although a few large schemes have been or are being developed, the resources of the country are practically untouched. There can be little doubt that in the course of time a large amount of cheap energy will be available in India for use in industrial processes, and as the country possesses a large and prolific population readily trained to mechanical and industrial processes, along with ample supplies of raw material for many such processes, all the conditions would appear to be favorable for its entry into the rank of manufacturing and industrial nations.

Modern Tendencies in Water-power Development

The large amount of attention which has been concentrated on the various aspects of water power development during the past ten years has been responsible for great modifications and improvements in the design, arrangement, and construction of the plant.

Broadly speaking, these have been in the direction of increasing the size, capacity, reliability, and efficiency of individual units; of improving the design of the turbine setting and of the head and tail works; of increasing the rotative speed of low head turbines; of detailed modifications in the reaction type of turbine to enable it to operate under higher heads than have hitherto been considered feasible; and of increasing the voltage utilized in transmission.

The capacity of individual units has been increased rapidly during recent years, and at the present time units having a maximum capacity of 55,000 horsepower under a head of 305 ft. are being installed in the Queenston-Chippewa project at Niagara, while units of 100,000 horsepower are projected for an extension of the same plant.

These modern high-power turbines are usually of the vertical shaft, single runner type, with the weight of the shaft, runner, and generator carried from a single-thrust bearing of the Michell type. This type lends itself to a simple and efficient form of setting, while the friction losses in the turbine are extremely low. As a result of careful overall design it has been found possible to build units of this type having an efficiency of approximately 93 per cent.

One of the great drawbacks of the low head turbine in the past has been its relatively slow speed of rotation, which necessitated either a slow speed, and consequently costly generator, or expensive gearing. As a result of experiment it has, however, been possible so to modify the form of the runner as greatly to increase the speed of rotation under a given head without seriously reducing the efficiency.

Investigations in this direction are still in progress and promise to give rise to important results. At the present time, however, turbines are in existence which are capable of working efficiently at speeds at least five times as great as would have been thought feasible ten years ago.

Welded Pipe for High Heads

The non-provision of a suitable pipe line has, until recent years, tended to retard the development of plants for very high heads. Under such heads the necessary wall thickness, even with a moderate pipe diameter, becomes too great to permit of the use of riveted joints. Recent developments in electric welding and oxy-acetylene welding have, however, rendered it possible to construct suitable welded pipes, and by their aid, and by the use of solid-drawn steel pipes in extreme cases, it has been found possible to harness some very high falls. The highest as yet utilized is at the Fully installation in Switzerland. Here the working head is 5412 ft., corresponding to a working pressure of 2360 lbs per square inch. The pipe line is 19.7 in. in diameter and 1¾ in. thick at its lower end, and each of the three Pelton wheels in the power house develops 3000 horsepower, with an efficiency of 82 per cent.

Until comparatively recently the Pelton wheel was looked upon as the only practicable turbine of high heads, and the use of the Francis turbine was restricted to heads below about 400 ft. This was due partly to the fact that a reaction turbine of comparatively small dimensions gives a large output under a high head, and except in turbines of comparatively large power the water passages become very small and the friction losses in consequence large.

A further and more important reason for the general choice of the Pelton wheel for high heads was the fact that in the earliest Francis turbines, when operating under heads involving high speeds of water flow, corrosion of the runner was very serious. This corrosion is now generally attributed to the liberation of air containing nascent oxygen at points where eddy formation causes regions of low pressure. Careful design of the vanes has enabled this to be largely prevented in modern runners, and in consequence the field of useful application of the Francis turbine has been extended until at present turbines of this type are operating successfully under a head of 850 ft., and this limit will probably be exceeded in the near future.

The great increase in all constructional costs since 1914 has increased the cost of the average hydro-electric plant by something of the order of 150 per cent., and since the cost of energy produced by such a plant is mainly due to fixed charges on the capital expenditure this cost has gone up in an even greater proportion owing to the higher interest charges now demanded.

It is true that the same increased cost applies within narrow limits to the output from every steam plant erected since the war, and the relative position of the two types of power plant with coal at about 25s per ton is much the same as before the war.

The fact remains, however, that a newly constructed hydro-electric plant has often to compete in the market with a steam plant built in pre-war days whose standing charges are comparatively low, and in order to enable it to do so with success the constructional cost must often be reduced to a minimum compatible with safe and efficient operation. With this in view many modifications in design and construction have been introduced in recent plants, but there would still appear to be ample scope for investigation into the possibility of reducing the first cost by modifying many of the details of design and methods of construction now in common use.

Modification in Plant Design

Among recent modifications in this direction may be mentioned:—

1. The elimination of the dam in storage schemes in which natural lochs or reservoirs are utilized, this water level being drawn down in times of drought instead of being raised in times of flood. This reduces the cost of construction appreciably in favorable circumstances and eliminates the necessity for paying compensation for flooding of the land surrounding the reservoir.

2. The substitution, where feasible, of rockfill dams for those of masonry or monolithic concrete.

3. The introduction of outdoor installations with the minimum of power house construction.

4. The simplification of the power plant.

Some progress has already been made in these directions, and it is probable that experience based on recent installations and experimental investigations will enable considerable further progress to be made.

Research in Hydro-electric Problems

There are few branches of engineering in which research is more urgently required and in which it might be more directly useful.

Among the many questions still requiring investigation on the civil and mechanical side may be mentioned:

1. Turbines.—Investigation of turbine corrosion as affected by the material and shape of the vanes.

Effects of erosion due to sand and silt.

Resistance to erosion offered by different materials and coatings.

Bucket design in low head high-speed turbines.

Draught tube design.

Investigations of the directions and velocities of flow in modern types of high-speed turbines.

Investigation of the degree of guidance as affected by the number of guide and runner vanes.

2. Conduits and Pressure Tunnels.—The design of large pipe lines under low heads with the view of reducing the weight of metal. The investigation of anti-corrosive coatings, so as to reduce the necessity for additional wall thickness to allow for corrosion.

Methods of strengthening large thin-walled pipes against bending and against external pressures.

Methods of lining open canals and of boring and lining pressure tunnels.

Effects of curvature in a canal or tunnel.

3. Dams.—Most efficient methods of construction and best form of section especially for rockfill and earthen dams. Best methods of producing water tightness.

4. Run-off Data.—Since the possibility of designing an installation to develop the available power efficiently and economically depends in many cases essentially on the accuracy of the run-off data available, the possession of accurate data extending over a long series of years is of great value.

While such data may be obtained either from steam gaugings or from rainfall and evaporation records, the former method is by far the more reliable. For a seasonable degree of accuracy, however, records must be available extending over a long period of years, and at the present moment such data are available only in very few cases.

Where accurate rainfall and evaporation records are available it is possible to obtain what is often a sufficiently close approximation to the run-off, but even rainfall records are not generally at hand where they are most required, and even in a district where such records are available they are usually confined to easily accessible points, and are seldom extended to the higher levels of a catchment area where the rainfall is greatest. Even throughout the United Kingdom our knowledge of the rainfall at elevations exceeding 500 ft. is not satisfactory, and little definite is known concerning that at elevations exceeding 1000 ft.

In this country evaporation may account for between 20 and 50 per cent. of the annual rainfall, depending on the physical characteristics of the site, its exposure, mean temperature, and the type of surface covering. In some countries evaporation may account for anything up to 100 per cent. of the rainfall. As yet, however, few records are available as to the effect of the many variables involved. An investigation devoted to the question of evaporation from water surfaces and from surfaces covered with bare soil and with various crops, under different conditions of wind, exposure, and mean temperature, would appear to be urgently needed. If this could be combined with an extension of Vermeulle's investigation into the relationship between rainfall, evaporation, and run-off on watersheds of a few characteristic types, it would do much towards enabling an accurate estimate of the water power possibilities of any given site to be predetermined.

Even more useful results would follow the initiation of a systematic scheme of gauging applied to all streams affording potential power sites.

Among other questions which are ripe for investigation may be mentioned:—

1. The combined operation of steam and water power plants to give maximum all-round efficiency.

2. The relative advantages of high-voltage direct-current and alternating-current generation and transmission for short distances.

3. The operation of automatic and semi-automatic generating stations.

Tidal Power

The question of tidal power has received much attention during the last few years. In this country it has been considered by the Water Power Resources Committee of the Board of Trade, which has issued a special tidal power report dealing more particularly with a suggested scheme on the Severn. The outline of a specific scheme on the same estuary was published by the Ministry of Transport towards the end of 1920.

In France a special commission has been appointed by the Ministry of Public Works to consider the development of tidal power, and it has been decided to erect a 3000-kilowatt experimental plant on the coast of Brittany. With the view of encouraging research, the Government proposes to grant concessions, where required, for the laying down of additional installations.

The tidal rise and fall around our coasts represent an enormous amount of energy, as may be exemplified by the fact that the power obtainable from the suggested Severn installation alone, for a period of eight hours daily throughout the year, would be of the order of 450,000 horsepower.

Many suggestions for utilizing the tides by the use of current motors, float-operated air compressors, and the like, have been made, but the only practicable means of utilizing tidal energy on any large scale would appear to involve the provision of one or more dams, impounding the water in tidal basins, and the use of the impounded water to drive turbines.

The energy thus rendered available is, however, intermittent; the average working head is low and varies daily within very wide limits, while the maximum daily output varies widely as between spring and neap tides.

If some electro-chemical or electro-physical process were available, capable of utilizing an intermittent energy supply subject to variations of this kind, the value of tidal power would be greatly increased. At the moment, however, no such process is commercially available, and in order to utilise any isolated tidal scheme for normal industrial application it is necessary to provide means for converting the variable output into a continuous supply constant throughout the normal working period.

Various schemes have been suggested for obtaining a continuous output by the co-ordinated operation of two or more tidal basins separated from each other and from the sea by dams with appropriate sluice gates. This method, however, can only get over the difficulty of equalizing the outputs of spring and neap tides if it be arranged that the maximum rate of output is that governed by the working head at the lowest neap tide, in which case only a small fraction of the available energy is utilized.

When a single tidal basin is used it is necessary to provide some storage system to absorb a portion of the energy during the daily and fortnightly periods of maximum output, and for this purpose the most promising method at the moment appears to involve the use of an auxiliary high-level reservoir into which water is pumped when excess energy is available, to be used to drive secondary turbines as required. It is, however, possible that better methods may be devised. Storage by the use of electrically heated boilers has been suggested, and the whole field of storage is one which would probably well repay investigation.

If a sufficiently extensive electrical network were available, linking up a number of large steam and inland water power stations, a tidal power scheme might readily be connected into such a network without any storage being necessary, and this would appear to be a possibility which should not be overlooked in the case of our own country.

A tidal power project on any large scale involves a number of special problems for the satisfactory solution of which our present data are inadequate.

Thus the effect of a barrage on the silting of a large estuary, and the exact effect on the level in the estuary and in the tidal basin at any given time, can only be determined by experiment, either on a small installation or preferably on a model of the large scheme.

Many of the hydraulic, mechanical, and electrical problems involved are comparatively new, and there is little practical experience to serve as a basis of their solution.

Among these may be mentioned:

1. The most advantageous cycle of operations as regards working periods, mean head, and variations of head.
2. The methods of control and of sluice gate operation.
3. Effect of changes of level due to wind or waves.
4. The best form of turbine and setting and the most economical turbine capacity.
5. The possibilities of undue corrosion of turbine parts in salt water.
6. The best method of operation; constant or variable speed.
7. Whether the generators shall be geared or direct driven.
8. Whether generation shall be by direct or alternating current.

The questions of interference with navigation and with fisheries, of utilizing the dam for rail or road transport across the estuary, and, above all, economic questions connected with the cost of production, and the disposal of the output of such an installation, also require the most careful consideration before a scheme of any magnitude can be embarked upon with assurance of success.

In view of the magnitude of the interests involved and of the fact that rough preliminary estimates indicate that to-day current even for an ordinary industrial load could be supplied from such an installation at a price lower than from a steam generating station giving the same output with coal at its present price, it would appear desirable that these problems should receive adequate investigation at an early date.

In view of the considerations already outlined, and especially in view of the large part which British engineering will probably play in future water power developments, the provision on an adequate scale at some institution in this country of facilities for research on hydraulic and cognate problems connected with the development of water power is worthy of serious attention.

At present the subject is treated in the curriculum of the engineering schools of one or two of our universities, but in no case is the laboratory equipment really adequate for the purpose in question.

What is required is a research laboratory with facilities for experiments on the flow of water on a fairly large scale; for carrying out turbine tests on models of sufficient capacity to serve as a basis for design; and, if possible, working in conjunction with one or more of the hydro-electric stations already in existence, or to be installed in the country, at which certain large scale work might be carried out.

The provisions of such a laboratory is at the moment under consideration in the United States, and in view of the rapidity with which the designs of hydraulic prime movers and their accessories are being improved at the moment, it would appear most desirable that the British designer, in order that the deservedly high status of his products should be maintained and enhanced, should at least have access to equal facilities, and should, if necessary, be able to submit any outstanding problems to investigation by a specially trained staff.

The extent to which our various heat engine laboratories have been able of recent years to assist in the development of the internal combustion engine, and to which our experimental tanks have assisted in the development of the shipbuilding industry, is well known to most of us, and the provision of similar facilities to assist in the development of our hydro-electric industry would probably have equally good results in this connection.

The Development of Wireless—I

A Series of Short Interesting Articles Covering Wireless Progress to Date

By F. K. D'ALTON

In the present day, when wireless communication has reached such a high state of efficiency that the human voice can be carried over distances of hundreds of miles through the ether, it is interesting to review the steps in the development of this art and to predict its future as we see it.

There are many methods used in the communication of intelligence and these may be classified under two headings—

(a) Where the transmitted energy is guided to its destination.

(b) Where the transmitted energy is radiated in all directions.

In the former class come such methods as messenger service, postal service, telegraph, telephone and, perhaps the simpler speaking tube; but the latter class includes sound and light and also the subject of this paper—radio communication,whereas any of the systems under the second heading may rightly be callel "radio" systems, the term is restricted and now understood to mean communication by radiated waves which are produced electrically.

All systems of communication require three parts,—the transmitter, the conducting medium and the receiver, and the fact that the transmitter and receiver are at some distance from each other gives the system a purpose.

The vocal cords, the air and the ear form a complete communication system but the velocity of propagation of sound waves is low—about 1100 ft. per second and the transmitted energy is rapidly diminished as it travels.

With a system using light where the illuminant, the ether and the eye form the three important parts, a very much greater speed is attained—approximately 188,000 miles per second. The radiated energy is not so rapidly reduced.

Sound waves are impeded by certain materials and conducted more freely by others and in much the same way particular materials are opaque and will not permit the passage of light through them while the transparent and translucent substances will allow it to travel through them with more or less diversion in direction. Both light and sound waves will travel in all directions from the source if so permitted but sound waves will surround an object whereas the light waves travel in straight lines.

If now we take a string of fixed length and cross section and submit it to a given stress in tension, we will find on plucking it that a definite note is emitted and each time we perform this experiment the pitch is the same. A change in any of the above constants will alter the pitch unless two of these quantities be so changed that their effects counteract each other.

The pitch of the sound depends then upon certain constants in the sound producing device, and is a measure of the length of the emitted sound waves. A change of wave length entails a change of pitch; the longer waves giving the lower pitch and vice versa.

In the study of light we find that certain constants in the source determine the color, or mixture of colors of the light radiated and here the wave length is also a definite amount; variations in wave length showing themselves as changes in color.

In wireless communication, waves considerably longer than light waves are used. These are radiated in all directions with fixed wave lengths and follow most of the laws of light with the exception that they will penetrate most of the substances which are opaque to light. The methods used for generating these waves use electricity as a means to an end and in fact, this is the only known agent. The wave lengths are determined by certain electrical constants in the circuits of the transmitter. Changes in wave length do not appear as differences in pitch or color but necessitate changes in the constants of the receiving device and in this way provide an excellent means of selection of particular stations. Unlike sound or light waves, these wireless waves are not detectable by the human senses until certain changes have been made which result in the emission of sound corresponding to variations in the wireless waves themselves.

While communication by sound and light has been used for centuries, it is only within the last three score years that anything has been known about wireless.

The first electrical methods of communication were, of course, the land telegraph over wire lines, in which a conventional code was used; the operators necessarily had to be educated in this code. The received messages were written down by a marking device which made short and long marks on a moving tape. The operator then more or less at his leisure, could interpret these markings and write them as the letters of the alphabet which they represented.

It was not very long until operators found that by ear they could read and interpret the ticking of the automatic machine with the result that the recording devices were discarded and the messages written down in the actual words for which they stood. Greater speed was in this way obtained, and now in the ordinary railway and telegraph office, the station masters and operators use their sense of hearing in receiving signals.

We cannot leave the land telegraph system without suggesting to the minds of our readers a few late developments. High speed combined with absolute accuracy characterizes the present day automatic receiver which without the aid of any interpreter writes the incoming message in readable form, very much exceeds the speed of translation of the best operators and can run all day at top speed without tiring.

Economy is obtained by means of multiplex methods whereby many messages are sent simultaneously over a pair of conductors without the slightest interference or deviation from their intended courses.

Prof. Alexander Graham Bell made the first marked improvement on the land telegraph when he introduced a transmitting device which caused the current in the line to vary in accordance with sound waves, and at the receiving end introduced a device which would regenerate the sound waves from the variations in the current, thus making possible the telephone.

We need hardly hesitate to mention the rapidity with which the telephone has developed, and the manner in which it has changed from a mere experimental accomplishment to a common necessity of life, particularly in the business world.

The elements in the system have been improved to give almost perfect speech over distances of thousands of miles; lines have been extended, freed, by many novel schemes of interference from power lines and other electrical circuits until to-day it is a mere matter of a few minutes for one person to get into touch with any other person wherever he be on the continent. It is doubtful if anything will supersede this system, which to-day is augmented by the radio, enabling one to carry on personal conversation with others, at sea or in isolated places as well as in accessible locations on land.

In the next issue we shall commence the story of Radio. Many of the difficulties and obstacles to be overcome in finally producing the now popular wireless telephone may be surmised in considering the limitations of other methods of communication as to both publicity of messages and power used.

The Electrical Contractor

Is The Contractor-Dealer an Individual or a Team?

By CHARLES L. EIDLITZ*

For several years past we have heard that the contractor should and must turn his attention to merchandising. This has been preached, written about, and exploited loudly by men who, it seems to me, ought to have known better.

I have had twenty-five years of contracting experience, I have met I believe nearly all kinds of contractors in my thirty-three years in the electrical line, and I can say without fear of contradiction that practically none of the men whom I know as contractors have the requisite knowledge, instinct, or experience that goes to make a successful merchant.

The contracting business, except perhaps in the smallest towns, is distinctly an engineering proposition. The training of the men in this line is entirely opposed to the training necessary to make a man a good merchant. I feel I can go even a bit further, i. e., that the very fact that a man selects contracting as his business, proves conclusively that he has no leaning toward the merchant type of business.

When I say that an electrical contractor should not take on merchandising, I do not mean that the small contractor or electrician should not carry a stock of electrical materials, if there is no supply house in his locality. There can be no possible harm that I can see in his having such a stock, nor in his attempting to turn over a few dollars here and there by disposing of it, either for profit, or for the accommodation of his clients, but I do say, and most emphatically, that the electrical contractor in the larger cities should not and cannot successfully make a combination of contracting and merchandising, and that if he tries it he will make a failure of both.

A man who has successfully run a merchandising business may take on a repair work contracting line as a side issue but the reverse of this arrangement will not work out.

The reason for this seems to me to be perfectly plain and simple. The successful contractor is more or less of an engineer, and he comes in contact with his clients in an advisory capacity. It is his function to construct for his purchaser an efficient, economical system, and I defy any man to do this satisfactorily and honestly, if every time he thinks of an outlet on a plan, he is at the same time figuring on selling his client some device which he has in stock, and the sale of which will net him a profit.

If a contractor represents or carries some special line of material in stock he is bound to try and sell this material to his client.

How much faith would you have in a doctor who was known to be interested in some special patent medicine, and whose prescriptions seemed to consist mainly of this particular medicine? Would you not begin to be a little suspicious? When suspicion enters at all in professional matters, confidence immediately begins to sneak for the door.

I am sure that every jobber, manufacturer and contractor will agree with me that a consulting engineer, i. e., one who regularly prepares plans and specifications, should not be in the employ of or be retained in any way by any manufacturer, whose materials are required in the lines in which the engineer specifies. Would not an owner justly look with suspicion on one so connected? And so the contractor, when acting as engineer or adviser, is in the same class if he carries a stock of goods.

It is perfectly proper for a contractor doing the construction work on a job to sell the owner the motors, etc., but what kind of a motor do you think the contractor would sell if he had a large stock of Specific Electric Company motors in his place, all paid for and unsold? Wouldn't he try to get rid of his stock? Wouldn't that be absolutely natural? Yet, this particular type of motor might not be the best type for the job in question.

Would the contractor sell him the exact size necessary, if he had a lot of near sizes in stock? In other words, and in blunt words, would the contractor pass up the opportunity to unload his stock?

For this reason if for no other, the contractor must remain a free lance, he must not have a stock of motors, appliances, etc. He must be free to buy what he believes best for the particular job in hand, and must be uninfluenced by anything except the giving to the owner or client, the best judgment that he has. ....

So much then for the moral side.

As a money-making proposition there can be only one answer. The type of men who have made successes in these two lines, are absolutely dissimilar.

The contracting business being practically a profession, while merchandsing is distinctly a business, the entire training of the men is different. In the case of contracting the men are accustomed to buying for a sale already made, while in merchandising the buying is of a speculative nature; the judgment of the buyer as to salability, values, and similar considerations being essential to success.

If the advocates of contractor-dealer schemes think that a contractor should take the profits made in contracting, and sink them in an attempt to popularize the use and sale of devices, made by some special manufacturer, they certainly have not been clever in their attempts to put it over, and I think that I can repeat my statement made at the Buffalo convention, "that I would rather be an old fogy type of electrical contractor than a half-baked merchant."

And to sum up the whole situation it seems to me that there has been a whole lot of wasted effort and energy, that has cost nearly everyone some money, and that has resulted in messing up the entire business without having accomplished anything of a constructive nature.

In the meantime this "would-be-dealer" has tied up money in devices that he does not know how to market, money that he might better have spent for developing his contracting business on which he could have made a profit by selling proper installations. But as it is, he has neither helped the appliance business nor increased his contracting business.

Why not leave things alone? The small contractor was always something of a dealer. The large contractor has always handled certain material sales in conjunction with his work or for the accommodation of his clients. If the industry is looking for a name for the man who makes a business of selling heaters, fans, toasters, washing machines vacuum cleaners, and the like, call him an electrical merchant and let the contractor attend to his own work without this ridiculous and unnecessary excitement, caused by trying to tie a can to his tail filled with electrical merchandise, which may make a lot of noise as he travels around banging it on the pavement, but heavens and earth! this does not make him a dealer, and it never will.

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*Ex-president N.E.C.A., in Electrical Record

Changing a Fireproof Warehouse into a Modern Office Building

The Imperial Office Building, Hamilton, is located at the corner of Hughson and Main Sts. This building was formerly a modern fireproof warehouse for storage purposes. The structure was orginally designed for 12 storeys.

The Mills Bros. Ltd., of Hamilton recently purchased this building and made extensive alterations to the interior to provide modern offices for rental. When the alterations were completed the two top floors were equipped for the Canada Business College. The District Income Tax collector's offices are located on the entire fourth floor. The ground floor was equipped for the Chamber of Commerce headquarteers.

The alterations to the building included the following: partitions were provided for the subdivision of the several offices, corridors etc; also passenger elevators, toilets, vaults, stairway, heating system and lighting system. One passenger elevator has been installed of the most modern direct-connected type made by the Otis Fensom Elevator Co. The final installation will include an additional elevator. A separate source of power is provided for each to assure continuity of service and minimum delay and inconvenience to the tenants. Alternating current is used for the elevator service and is proving very satisfactory, eliminating any possible breakdown of a motor-generator set which might cause trouble had direct current been used. The initial cost was much lower.

The lighting, which was installed by Culley & Breay of Hamilton, was a complete conduit system throughout. The conduit was exposed throughout as shown in the photographs. The lighting service is provided from two sources to provide for continuous service and prevent inconvenience to the tenants; all offices and space has been rented with light. With an installation of this type it is unnecessary to provide individual meters, the installation is not so complicated and any changing in the offices does not require alterations to wiring. Sufficient capacity has been provided in all branch wiring, risers and mains for extensions and increased loads. The mains have been designed to provide for the additional six storeys to be added in future.

The service equipment is Square D. with large double-throw switch for emergency purposes. The power and lighting service enters on Main St. through a standpipe. This standpipe is only temporary until the underground system of the company is completed. The transformer vault for the underground system is located at the same point outside.

The lighting system required special study as the owners required it to be such that it would not be necessary to use desk lamps and further, they wanted to use three different types of fixtures. The fixtures had to be readily removable without having to make joints in the wiring. The outlet must be such that a lamp could be installed if a fixture were not required or a drop cord could be installed. Pull switches were provided near each outlet for individual control, using Bryant No. 2387 pull switches on an outlet box for this purpose.

To meet full requirements of the owners it was decided to use the Benjamin fixture connector No. 1412 and Benjamin outlet box receptacle No.1405. The brass cover of the receptacle made a neat appearance and finish. It was possible with this receptacle to use a ball and bands in the halls, toilets and stairways as a fixture.

The tenants installed their own fixtures, two different types of which are shown. Any person could install the fixture. It was even unnecessary to have the services of a wireman as the contractor sold the fixtures complete over-the counter ready for installation. This proved a wonderful saving and convenience. The tenants could change fixtures about without altering the wiring in any way. No matter what type of fixture they had it could be connected with the proper fittings sold by the dealer over the counter.

The mobility and flexibility of this system was appreciated by the owners and tenants. The dealer did not have any worry or lose any money with the fixture installation. The Superintendent of the work highly recommends this method to all persons contemplating equipping a building such as this one; in fact it could be used in all office buildings and industrial buildings to advantage. The small extra cost per outlet was very trifling when the convenience is considered. The pull switch at every outlet gave the maximum convenience and control and for office buildings is much more desirable where rooms may be altered to meet different requirements. It eliminates the necessity of moving wall switches when partitions are changed.

The entire electrical installation was designed and supervised by V. K. Stalford, Hamilton, Ontario.

Was a Prominent Contractor

Mr. Harry A. Rooks, of the Rooks Electric Co., Toronto, died on December 16. Deceased was born at London, Ont., 42 years ago and came to Toronto 18 years ago. He was always active in association work and was a member of the original committee of the Toronto Electrical Contractors' Association, and for the last three years had been a member of the Ontario Association of Electrical Contractors & Dealers. Whatever movement was under way for the good of the industry, Harry could be depended upon to put his hand in his pocket. Among the men in the trade, where he was well known and universally liked, he will be greatly missed. The business will be carried on under the same name.

In a recent statement, Thomas Edison said: "I have been through five depressions during my business life. They all act alike. This latest one acts exactly like all the rest. The men who, as business fell off 60%, increased their selling and advertising effort 75%, managed to pull through as if there were no depression, and efforts of such men tend to shorten the periods of depression.

The Canada Electric Co., 175 King St. E., Toronto, has secured the contract for electric wiring on the stables and sheds to be erected at the north end of the city by the Board of Control at an estimated cost of $60,000. Also the contract for electrical work on a new school to be erected on Coxwell & Sammon Avenues by the trustees of S. S. No. 7.

BETTER MERCHANDISING

Off to a Good Start

Toronto Electrical Interests Leading Off with Electrical Home Campaign

The Toronto electrical industry is starting this year 1922 off with an Educative Campaign which doubtless, will be the means of stimulating and creating business for every section of the industry.

The first move takes the form of an "Electrical Home." The plan, indeed, calls for a series of four homes to be shown during the first three or four months of the year. The first home will be opened on Saturday, January 21.

This decision is the result of much preliminary work on the part of a representative committee of electrical men who have been meeting almost daily for several weeks discussing ways and means and, in a general way, "prospecting" the field with a view to locating any unexpected obstacles. The decision has now been definitely reached that the time is opportune to "start something" and it has been deemed advisable to open the campaign, as noted above, with the first Electrical Home exhibit on January 21. This home will remain open for a period of two weeks.

The general committee that has been working on this campaign includes the various interests involved—central stations, manufacturers, jobbers, contractor-dealers. Members of the committee include such well-known names as E. M. Ashworth, acting general manager Toronto Hydro-electric system; J. Herbert Hall, managing director Conduits, Limited; C. A. McLean, general manager Masco Company, Ltd.; W. R. Ostrom, manager Northern Electric Company; A. S. Edgar, manager Supply Department, Canadian General Electric Company; E. A. Drury, chairman Toronto Contractor-Dealers' Association; A. W. J. Stewart, manager Appliance Department, Toronto Hydro, and F. John Bell.

Through the kindness of the Society for Electrical Development, Mr. Kenneth A. McIntyre, Canadian representative, has been delegated to give his entire time, free of charge, to the organizing of the campaign.

Complete details of the campaign are being distributed through the mails and will probably have reached those interested before this issue of the Electrical News is off the press.

Quebec Contractors and Dealers, English Section, Report Very Successful Year's Work

At a well attended meeting of the English Section of the Electrical Contractor-Dealers Association, Province of Quebec, held in room 305 Drummond Building, the following officers were elected: President, J. A. Anderson, of J. A. Anderson & Co; vice-president, E. J. Gunn, Gunn Electric Company; secretary-treasurer, Louis Kon, secretary manager Electrical Co-operative Association, Province of Quebec.

The executive consists of: Messrs. J. M. Walkley, the retiring president, R. S. Muir, M. R. Henry, H. Vincent, and C. E. Barrett.

The same committees as last year were re-appointed to continue the work of better business relations between the jobbers and the contractor-dealers, the French and English Sections, and the Electrical Co-operative Association, Province of Quebec.

Great appreciation of the work of Messrs. Gunn, Walkley and Anderson, as members of the committee handling the adjustment of problems between the jobbers and contractor-dealers was expressed by all the members present, and a spirit of satisfaction as to results achieved lately and determination to bring about a higher standing of the electrical contractor-dealers in the business communities of the province was very marked in the speeches of all the members.

It was also felt that the work of Messrs. St. Amour, Rochon and Pelletier, who were appointed by the French Section to act jointly with the English Section of the Contractor-Dealers Association in achieving the above is already showing considerable progress.

The Electrical Contractor-Dealers' Association has justified its formation. Previous endeavors to get the contractor-dealers in Montreal to combine failed, partly because of the language difficulty, and partly because of lack of sustained interest. This is now a thing of the past. Mr. J. A. Anderson, the new president, in an interview with a representative of the Electrical News, outlined the work of the association during the past year, and told of the harmony that prevails between the English and French sections. The division into sections has worked out in an admirable way, each doing its work in its own way, but on a co-operative basis.

"It was only during the past few months that the association accomplished anything tangible," said Mr. Anderson. "A committee, composed of Messrs. J. M. Walkley, E. J. Gunn, and myself, interviewed the jobbers with a view to securing concerted action in connection with surplus stocks and also to obtain more stability with regard to the prices quoted by jobbers and by contractor-dealers. While we recognize that competition is desirable and inevitable, yet it was felt that conditions were such as to leave little or no profit to those immediately concerned. Some progress has been made as the result of the negotiations. The jobbers agreed that the position taken by the contractors is reasonable. On our part we believe that jobbers should not deal with consumers at wholesale rates, but that they are entitled to sell to consumers at the full retail prices; at the same time our view is that jobbers should eliminate as far as possble this class of business, which really belongs to the contractor-dealer.

"Another question discussed with the jobbers related to dealing with industrial concerns by the jobbers. An industrial concern coming within the scope of the jobbers was defined as one having a permanent electrical staff. The Federal and Provincial Governments, municipalities, railways, and certain very large companies are within that category, but the contractor-dealers are of opinion that there are many concerns that do not buy heavily and that should be the exclusive customers of the contractor-dealers.

"The French Section gave us the most cordial co-operation in approaching the jobbers. A committee consisting of Messrs. St. Amour, Rochon, and Pelletier, accompanied the English committee. Our relations with the French section are of the most cordial character, and I desire to express our appreciation of the assistance of Mr. Simoneau, the president, and the members, particularly in the matter of negotiating with the jobbers.

"The Province of Quebec has recently passed into law a measure of obliging electrical contractors to take out licenses to do business, and also obliging wiremen to undergo an examination and take out licenses as journeymen electricians. It is expected that the law will be put into operation in the near future, and the Government is preparing offices for the staff of examiners. This is a step in the direction of stopping unauthorized and incompetent people from tampering with a business which may be considered hazardous when handled by those who are incompetent. Let me illustrate what I mean by hazardous. In the event of a fuse blowing out a copper is put in to replace it; as the cause has not been removed, another fuse nearer the transformer blows out, and this in turn is replaced by another copper. Eventually there is no protection, the wires become overheated, and a fire results. The legislation referred to will undoubtedly tend to minimize these risks, as it will oblige the work to be done by men with adequate knowledge. The safety entry switch will also go a long way to assist in the reduction of fire hazards. The co-operation between the Government, power companies, Underwriters' Association, and contractors is all in the direction of safeguarding life and property.

"During the last three or four months the meetings of the English Section have been much better attended. The members are taking a deeper interest in the work, and are appreciating the advantages of getting together and of endeavoring to place our business in that foremost position to which it is entitled. Many of the older members, who had experience of former efforts to get united action, had almost given up hope of obtaining a real effective organization, but late events have shown that something can be accomplished, and even the most pessimistic have to admit that our recent meetings have been very successful and that we have obtained results.

"As members of the Electrrical Co-Operative Association, Province of Quebec, we have had an opportunity of interchanging opinions, of knowing members of other departments of the electrical industry, of getting to understand each other, and of obtaining such information as will lead to greater sympathy with the viewpoints of all branches interested in our industry.

"We hope as the result of this understanding between the jobbers and contractor-dealers to be able to report at the end of 1922 the most successful year in the electrical history of Montreal. The era of misunderstanding, so destructive to our business, is passing away; we are getting down to a basis of real co-operation which will make for the benefit of all sections of the industry."

Your Share of $105,000,000!

Canada Will Spend This Sum for Electrical Appliances. Are You Equipped to Do Your Share?

By C. D. HENDERSON*

During the next three years Canadian people will spend at least one hundred and five million dollars ($105,000,000.00) in electrical appliances (clothes washers, ranges, vacuum cleaners, fixtures, ironers, irons, toasters, lamps, etc.) exclusive of wiring and repairs.

This figure is not a mere guess but rather a conservative estimate after a careful analysis of past and present conditions of the electrical industry in Canada.

Canada's per capita electrical development is larger than any other country in the world with the exception of Norway, while Canada's available horse power per capita is greater than any other country. There are more wired homes in Canada than in the United States, based on population and as "Wired Homes" is the most important element in the sale of appliances one can readily see that the sales possibilities offer wonderful opportunities.

Available records show that by the middle of 1922 there will be 1,000,000 homes in Canada using electricity, yet only about 5 per cent of these homes are enjoying the benefits of such labor-saving appliances as clothes washers, vacuum cleaners, electric ranges, etc., so that we need not worry about reaching the point of saturation for many years to come.

I suppose the reader wonders how I arrive at an estimate of $105,000,000 sales of appliances in three years. Well, let us do some figuring—every wired home must have tungsten lamps, and an average of say ten lamps per year, per home, gives us to begin with 30,000,000 lamps required at a sales value of about $15,000,000. This does not include the lamps required for stores, offices and factories.

Now, let us take ironers and toasters next. These appliances are generally the first to be purchased and during the next three years should amount to a couple of million dollars in sales value.

The next logical appliance is the vacuum cleaner. How many women will be satisfied to continue using the old broom and carpet sweeper when her neighbor is cleaning house with a vacuum cleaner?

Next let us consider the clothes washer. It is not necessary to prove to the woman in the home that an electric washer will wash clean without tearing the clothes. Almost every woman you meet, if she is not already using one, will tell you that she is going to invest in an electric clothes washer next.

Then comes the electric range. Show me the woman using an electric range who would go back to coal and gas, and with cheap electricity, such as we Canadians enjoy, I believe there will be 100 per cent more electric ranges sold in Canada during the next three years, based on population, than in any other country in the world.

Besides these main appliances that I have just mentioned there will also be a big sale for lighting fixtures, ironers, fans, vibrators, hot plates, heaters and numerous other appliances that are gradually coming into general use.

Considering these facts, would it be stretching our imagination to say that the average expenditure of each wired home would be $35.00 per year for the next three years? If this figure appears reasonable then simply multiply it by three (to cover the three year period) and then mutiply the balance by 1,000,000 wired homes and you get a total retail sales value of $105,000,000.00.

Let us visualize these figures by approaching the matter from another angle.

Estimate of Three Years Sales

	Total
100,000 homes will spend $300.00 each (electric ranges and sundries)	$30,000,000.00
100,000 homes will spend $200.00 each (electric washers, fixtures, etc.)	20,000,000.00
300,000 homes will spend $100.00 each (vacuum cleaners, fixtures, etc.)	30,000,000.00
200,000 homes will spend $80.00 each (fixtures and sundries)	16,000,000.00
300,000 homes will spend $30.00 each (small items, lamps, etc.)	$9,000,000.00
	$105,000,000.00

These figures are exclusive of wiring and repair work and cover appliances only.

Will this huge amount of money be spent through the electrical dealer who is the logical outlet or will the departmental and hardware stores received the largest portion of it?

The answer is that the matter is entirely in the hands of the electrical dealers—if they make a determined effort to swing the business their way they will have everything in their favor, and it will be quite possible to keep it within the electrical family because, when people think of electric appliances their thoughts naturally turn to the electrical dealer as they realize he is more familiar with the different makes and is in a better position to advise them and give service, but the departmental store and the hardware man have heretofore proven themselves better merchandisers and you may rest assured, they see the possibilities in this potential market and, therefore, will make a strong bid to swing the business their way.

The electrical dealer will not procure this appliance business by divine right—he must earn it. He should study carefully the different makes of appliances and make his choice from a standpoint of quality, service, prices and stability of the manufacturer. He must make his place of business look inviting to prospective purchasers and then go out and sell—instead of waiting for peaple to come and take the goods away from him.

In the next issue of the Electrical News I am contributing an article setting forth some ideas with a view to helping the electrical dealer capture and hold the appliance business. They are not original on my part but rather a summary of plans used by successful electrical dealers all over the Dominion.

It will do no harm to read the article. Even though you do not agree with the details you likely will agree with the principles and if any of the suggestions offered can be used to advantage by the readers of the Electrical News I shall feel amply repaid for the time and trouble spent in collecting and publishing them.

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*President Henderson Business Service, Ltd., Canadian Manager A. B. C. Co., Brantford, Ont.

Co-operative Association Will Issue Regular Bulletins

And Keep the Various Members and Sections in Touch with One Another's Operations

The Electrical Co-operative Association, Province of Quebec, have commenced the issue of regular bulletins to their members. The first appeared on December 15 and contains much interesting information. It will keep the various members and the various sections of the electrical industry in touch with one another's operations.

One of the chief items of interest in this Bulletin No. 1 is the announcement that the Association was negotiating a Christmas Shoppers' Electrical Week, December 19 to 24. The Association engaged window dressers to make window displays for that particular week in stores of members of the contractor-dealers' association. They also supply Emblem Cards, 11 in. by 14 in., which are to be prominently displayed in the stores in future and will represent a guarantee to the customer that the contractor-dealer is a member of an Association which stands for honest service and price. The jobbers have been requested to co-operate in this work and to have the windows of their clients who may not yet be members of the contractor-dealers association attended to.

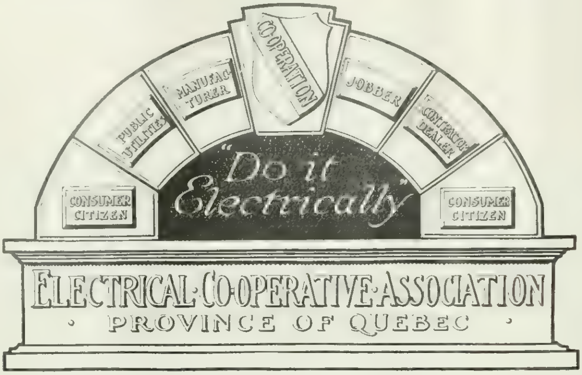
The bulletin points out that this is the first move in the larger campaign to assist the contractor-dealers to have their display windows frequently and attractively changed as the first essential to better business. It is pointed out that activities will temporarily be confined to Montreal but it is confidently expected that the rest of the province will be covered in the same way during the early summer.

The bulletin also explains the formation and operation of the Trade Relations Committee, which consists of representatives of the power companies, manufacturers, jobbers and both the English and French Sections of the contractor-dealers association. This committee meets every Tuesday for a couple of hours, discussing matters of vital interest to the trade, representing, so to speak, the searchlight of the industry in the province.

For the benefit of the contractor members a job contract form, as used by the Southern Canada Power Company, is attached to each copy of the bulletin and it is urged that every contractor in the province should use a form of this kind, as it protects him by covering minutely the work to be done and the price to be paid for it. It leaves no room for misunderstanding if the client should change the plan after the work is partly or fully completed. The association will supply any contractor-dealer or contractor in the province with as many forms as he may require, at a very small cost. This pre-supposes a fair number of orders being received. Contractors are urged to take advantage of this offer and to lend their assistance in introducing proper business methods and standardized forms into the electrical contracting business. A copy of the form to which reference is made is reproduced herewith.

	Ceiling Outlet **Débouché au plafond**	**Bracket Outlet** **Débouché au mur**	**Flush Receptacle** **Réceptacle à niveau**	**Surface Receptacle** **Réceptacle de surface**	**Single Pole Flush Switch** **Interrupteur à niveau à unipolaire**	**Three-Way Flush Switch** **Interrupteur à niveau à trois poles**	**Single Pole Snap Switch** **Interrupteur tournant à unipolaire**	**Three-Way Snap Switch** **Interrupteur tournant à trois poles**	**Pendant Switch** **Interrupteur à poire**	**Bell Outlet** **Débouché pour cloche**	**Bell-Ringing Transformer** **Transformateur à cloche**	**Underwriter's Certificate** **Certificat des Assureurs**	Method of Wiring Genre D'Installation					**Fixtures —Catalogue No** **Appliqués —Catalogue No**	**Glassware Catalogue No** **Verrerie Catalogue No**	**Lamps** **Ampoules**	**Type and Size** **Genre et grandeur**	
													Knob and Tube **Isolateur et tube**	**Galv. Rigid Conduit** **Conduit galv. rigide**	**Wood Moulding** **Moulure en bois**	**Metal Moulding** **Moulure métallique**	**Cleat Work** **Isolateur à taquet**					
Veranda **Véranda**																						
Front Porch **Porche de la façade**																						
Vestibule **Vestibule**																						
Lower Hall **Corridor inférieur**																						
Upper Hall **Corridor supérieur**																						
Parlor **Salon**																						
Living-room **Vivoir**																						
Den **Fumoir**																						
Dining-room **Salle à manger**																						
Kitchen **Cuisine**																						
Pantry **Dépense**																						
Basement **Sous-sol**																						
Bedroom **Chambre à coucher**																						
Bedroom **Chambre à coucher**																						
Bedroom **Chambre à coucher**																						
Bedroom **Chambre à coucher**																						
Bedroom **Chambre à coucher**																						
Bath-room **Salle de bain**																						
Back Porch **Arrière-porche**																						
Garage **Garage**																						
Cupboard **Placard**																						

Job Contract Form as used by Southern Canada Power Co.



This is the Emblem of the Electrical Co-operative Association, Province of Quebec. The Emblem is also issued in the French language. It is hoped that the Emblem will come to be recognized as representing a high standard of workmanship and service.

The New Secretary-Manager

The Electrical Co-Operative Association, Province of Quebec, began its second year's work with a new secretary-manager in charge. The Quebec association was looking for a secretary-manager with executive and organizing ability, of sound business principles and one that could impart the "do it electrically and co-operatively" spirit with equal ease to the English and French parts of the population of the Province of Quebec. They believe they have found such a man in Mr. Kon.

The new secretary-manager is a Westerner, and claims Winnipeg as his home where he lived for fourteen years, though for the past year and a half he was connected with the electrical appliance business in Eastern Canada. Mr. Kon was with the Grand Trunk Pacific Development in Winnipeg for some time and in 1910 represented the Grand Trunk and Grand Trunk Pacific Railways at the World's Fair in Brussels, Belgium, organizing and taking charge of their Immigration Department upon his return from Europe the following year. In 1916 he became Superintendent of Immigration and Colonization for the Province of Manitoba, entering in 1918 the services of the United Grain Growers' Securities, which work he left to assume the position of the secretary of the Canadian Economic Commission to Siberia at which work he spent nearly a year.

Mr. Louis Kon

Mr. Kon is a university graduate in economics and having specialized in that subject is a firm believer in the theory that the foundation of our industrial, commercial and social life must rest on co-operation.

"Hoover" Improving Their Advertising

National advertising for the Hoover Suction Sweeper, always of a high order, has been materially improved for the coming year. The new design is not alone more pleasing in appearance but provides, as well, a more effective and more flexible vehicle for telling the interesting Hoover story. Fully twice as much copy can be used in the new advertisements without any sacrifice of good appearance. One of the most notable improvements is the substitution of exquisite line drawings for half-tones in illustrating the messages. Always one of the most extensively advertised of electrical products, the Hoover will continue, during 1922, to bid for the attention of millions of readers through the columns of practically all the larger national magazines. Response to Hoover advertising during 1922 should be even more general and generous than the response of other years. The artistic line drawings and correct typography of the newer messages should win instant attention from their many readers. The compelling messages of Hoover worth, emphasized in each advertisement, should sustain and quicken a desire for Hoover ownership; creating new business for this meritorious and aggressively advertised product.

Electrical Co-operative Luncheon

At the weekly Electrical Co-operative Luncheon, held at Freeman's Hotel, Montreal, on December 7th, an interesting program was put on by the Entertainment Committee. Drawing for a handsome beaded necklace---the work of a disabled soldier at the hosital St. Anne de Bellevue---created considerable interest and amusement. Mr F. I. Spielman, of Spielman Agencies, added to the entertainment by the donation of one of his "Handilites"—a magneto flashlight which his company recently put on the market.

Stratford Joins Electrical Page Boosters

The city of Stratford is the latest to add the Electrical Page to the activities of the electrical industry. A sample just received indicates that a good deal of thought and hard work have been put forth by the electrical men of that city. The complete list of cities now carrying electrical pages regularly, in Ontario, is as follows: Hamilton; Ottawa; Windsor; St. Catharines; Kitchener; Brantford and Stratford.

Among Windsor District Contractors

The Windsor District Association of Electrical Contractors and Dealers held an important meeting on November 30th, 1921. After dinner at the Cadillac Cafe adjournment was made to the local Hydro office at the invitation of Mr. O. M. Perry, Windsor's hydro manager. Those present were Mr. V. B. Dickson, of the Barton-Netting Company, in the chair; Mr. F. D. Reaume; Mr. A. E. Roach, of the McNaughton-McKay Electric Co., Mr. F. Garfat, of the Electric Supply Co.; Mr. W. A. Lefave; Mr. O. M. Perry, manager Windsor Hydro; Mr. McKeller, of the Northern Electric Co.; Mr. M. J. McHenry, manager Walkerville Hydro; Mr. Firth, of the Canadian General Electric Co. and A. H. Cook.

The chairman explained, for the benefit of the visitors, the purpose of the Association, emphasizing that "Goodwill to the industry" prompted the activities. He then requested that the floor be left to the visitors and asked them to voice their views of the situation and the local electric situation.

Mr. McHenry spoke in favor of the Association and an all-embracing central electrical organization. He said the Hydro had no desire to "hog" the market. To maintain the load was the main object—not competition, but the boosting of appliance sales.

Mr. Perry spoke on the magnitude of hydro sales and the servicing of large and small appliances. Mr. McKeller spoke of the new farmers', or rural, lines bringing in big business—estimated at $1,000 per farmer, spread over a period of five years.

Mr.Firth said that competition was the life of trade, and he found the meeting to be very valuable in an educational sense.

After they had all expressed themselves as favorable to the Association, and to Mr. McHenry and Mr. McKeller had been assigned the duties of providing the Electrical Food for next meeting and arranging for the advertising, respectively, the meeting adjourned until December 9th.

December 9th Meeting

Owing to the nearness of Christmas, a full page advertising scheme in the local paper, the Border Cities Star, was the only business transacted. The advertising was arranged by Mr. McKeller, manager of the local branch of the Northern Electric Co. and makes a very effective showing.

Successful Exhibit at Nicolet

"The Electric Service Corporation held an electrical exhibiton at Nicolet, Quebec, on December 1st., 2nd. and 3rd. The results of the exhibiton were very satisfactory, displays being made of electrically operated utility machines such as pumps, cream separators, meat cutting machines, utility motors, churning machines, etc, as well as the usual line of electrical appliances such as stoves, portable lamps and domestic appliances. The results were so satisfactory that further exhibitions will be held in the spring, the first one opening at Berthierville."

Winnipeg Awards Meter Contracts

The city of Winnipeg recently purchased 3,000 meters, as follows: From Canadian Westinghouse Co. 1000, 10 ampere, 2-wire meters at $8.30, and 700, 20 ampere, 3-wire meters at $11.00; Packard Electric type R. 300, 25 ampere, 3-wire at $12.80; Sangamo Electric Co. 1000, 20 ampere, 3-wire at $11.00. It is worth noting that these prices are now as low, and possibly lower, than pre-war figures. It is true that in 1915, due to keen competitive conditions, prices went a couple of dollars lower, but during the next five years they almost doubled, so that the present prices indicate a reduction of from 30 to 35 per cent. from high.

Miscellaneous Activities

The Toronto Transportation Commission recently purchased from the Packard Ontario Motor Company a 4-wheel drive tractor snow plow to be used in keeping the bus routes open. It has a powerful motor and a five-speed transmission with a low gear ratio of 80 to 1.

Graham Electric Co, 929 Pender St., Vancouver, are among the enterprising firms who believe in constant improvement to make attractive presentation of electrical displays. Quite recently they have completed remodelling of their shop and window fixtures on an extensive scale. Inlaid hardwood floors in the show windows are among other improvements. Both in their windows and their show rooms they are able to make effective showing of fixtures and appliances.

Messrs. Rankin & Cherrill, old-time electrical dealers and contractors of Vancouver, have added another store to their enterprise. They have opened salesrooms at 528 Hastings St., where a complete stock of fittings and appliances is being handled. They continue their shop at 55 Hastings St., W., also.

Trade Publications

The Ward Leonard Electric Company, Mt. Vernon, N. Y., are distributing a booklet, Section D, describing and illustrating the use of Vitrohm (vitreous enamelled) Field Rheostats.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., are distributing catalogue 12-A, describing Safety Switches and Panel Boards. The catalogue is well illustrated.

The Wagner Electric Manufacturing Co., St. Louis, Mo., have issued a folder describing their "Pow-R-full," the latest addition to their line of motors. The new motor is a polyphase type. Bulletin No. 129 explains it more fully.

Conduits Company, Ltd., have issued catalogue No. 6, known as their Wire-Mold Catalogue. It deals with installation suggestions and is very fully illustrated, showing how the contractor may use this equipment in overcoming any difficulties he may meet with in his various installations.

Arc welding for repair and reclamation, general applications of arc welding, and arc welding for manufacturing processes are well described and illustrated in Leaflet 1825, just published by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. A story is told of how costs are reduced by the use of arc welding.

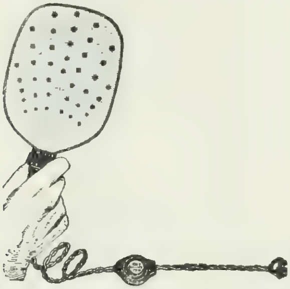
The Robbins & Myers Company are distributing a folder describing their line of generators, motors and motor-generator sets for radio service. This line includes 500 volt and 1000 volt generators and motor-generator sets of 100, 200 and 500 watts capacity for use with vacuum tubes and for other special services; also synchronous motors of ⅛ and 1/6 h.p. ratings for operating the synchronous type of rotary spark gap.

The "EV" type of alternating current, vertical water wheel driven generators is described and illustrated in Circular 3439, just issued by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The vertical unit is being much used for small and moderate capacity low head hydro-electric plants and the type "EV" comprises a line of a.c. generators, to fit the modern hydraulic setting and the same factor of safety in design and reliability in operation required of larger units.

What Is Newest in Electrical Equipment

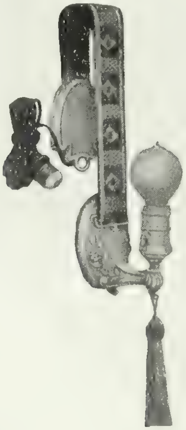
Lamp-Heated Warming Device

A new idea in a portable heater that can be used both as a bed warmer and for applying heat to bodily aches and pains is found in "Glo-Pax," made by the Twinplex Sales Company, 1627 Locust Street, St. Louis, Mo. This is a flat fan-shaped device, the warmth radiating from a small electric bulb held between two flat aluminum pieces, one face of which is perforated. A fleece cover is also provided. A heat regulator dial on the cord has three degrees of heat indicated on the dial but any number of intermediate degrees can be obtained by adjusting the arrow point at the place desired. To open the device in case the bulb burns out, the knurled metal collar is turned slightly and pulled a half-inch down the handle, leaving the perforated face free to be lifted up with the finger.



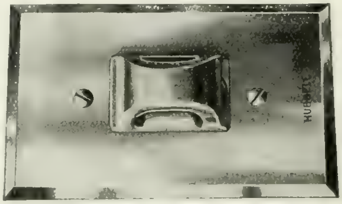
Hanging Lamp

A novelty hanging lamp device called the "Lampette," and made by the Colonial Lamp & Fixture Works, 5634 Lake Park Avenue, Chicago, introduces a new feature in the braided belt used to hang the lamp over any convenient point on chair or bed. The braids, shades, shields, and tassels may be had in a number of designs, colors and materials.



Flush Door Receptacle

A new type of flush door receptacle designed to combine the "invisible outlet" features with safety and ease in use, has been put on the market by Harvey Hubbell, Inc. The flush plate contains double "in-folding" doors, through which a cap passes. The porcelain body, concealed behind these doors, is provided with narrow, beveled slots, set tandem. These slots are just large enough to admit the brass blades of the cap, which, passing through them, are engaged by two double springs of phosphor-bronze. The springs are set within concealed contact chambers, and cannot be reached from the outside except by way of these slots. These receptacles are made with outlets for one or two caps. The receptacle body fits any standard outlet boxes.



Mr. Leacock, Official Entertainer

Mr. W. A. W. Bundock, B. Sc., A. M. I. E. E., Commissioner of Public Works Department, of Sydney, Australia, has been touring Canada and the United States for some time, gathering ideas on high tension stations and equipment, in company with Mr. Wildridge, consulting engineer, of the same city. He spent a day in Toronto, under the guidance of Mr. Geo. D. Leacock, inspecting some of the principal sub-stations. Another recent visitor to Toronto, on a similar mission, was Lieut.-Col. B. C. Battye, Public Works Commissioner, Punjab, India, who was also Mr. Leacock's guest.

Adds New Agency

The George C. Rough Sales Corporation, 134 Coristine Building, Montreal, announce that they have recently taken on the line of The States Company, of Hartford, Conn., which consists of apparatus for meter testing and laboratory specialties and accessories, including complete testing tables, phase sequence indicators, phasing transformers, phantom loads, potential phase shifters, etc. This line is of special interest to all companies who require extreme accuracy in the testing of meters. Descriptive bulletins will be mailed on request to those interested.

Back to Pre-War Service

The Crouse-Hinds Co. of Canada, Ltd., and Harvey Hubbell Co. of Canada, Ltd., have issued an interesting folder entitled, "Back to pre-war service." The folder lists the various agents of these companies in fifteen principal Canadian cities, indicating their facilities for supplying customers with "24-hour" service every day. The folder also shows a number of interesting views of the factories and warehouses, exterior and interior, of Mr. Mack's two companies.

The Canadian Electrical Supply Co., Ltd., are now handling the "Brantford Locomotive" electric washer, manufactured by the Brantford Washing Machine Co. The Canadian Electrical Supply Company's territory includes eastern Ontario and the province of Quebec.

Electric Railways

Rehabilitation of Toronto's Street Railway System—II

Details of Foundations, Rails, Intersections, Bonding and Surfacing

[This is the second of a series of articles covering the rehabilitation of the Toronto railway system. Our first article, which appeared in our issue of December 15, dealt only with the removal of old track and the excavation in preparation for the new track, and the foundation. The present article describes the foundation work, placing and bonding of the rails and the final surfacing.—Editor.]

Introduction

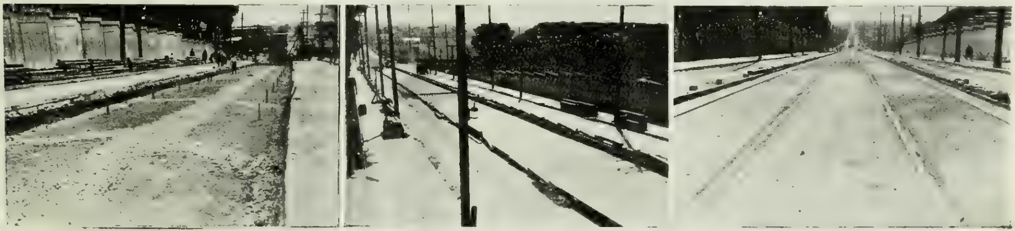
The track and road bed rehabilitation follows one or other of two general plans—(a) a concrete foundation; (b) crushed stone foundation. On foundations of the second type, granite block pavement only has been used, while on concrete slabs, either granite block paving or asphalt has been adopted, although the asphalt is in general merely a temporary substitute for granite blocks. Inability to secure sufficient material, on time, for all the track reconstruction under way compelled the commission to adopt asphalt. This will be taken up as it wears out and replaced by a more durable type of pavement, provision being made for this contingency by special construction, as described below. Plans are reproduced in this article illustrating the various types of construction.

The concreting of the base slab follows immediately upon the excavation, the sub-soil being first drained with a line of tile pipe, imbedded in gravel, along the centre line of the track allowance. The mixers are of the Foote type, producing a 21 cu. ft. batch. They are on caterpillar treads. The dry materials are pre-mixed at a central yard and conveyed in batch boxes to the mixer. Each batch box contains 33 cu. ft. of loose material, which is dumped into the loading skip of the mixer through bottom opening gates which are opened after the box is spotted over the skip by means of a derrick on the mixer body. Two batch boxes are carried on a truck and the trucks are so timed that no delay is occasioned through failure of supplies. Concreting operations are, therefore, continuous and very rapid progress is made, so much so that it has been found necessary to keep the steam shovel very much in advance of the mixer. The foundation slab is of 1:2½:5 mix, trap rock running from 2 in. to ½ in. in size, as the coarse aggregate. Nine inches is the standard depth of slab. When this foundation has taken its set, ties and rails are laid and roughly aligned. Oak ties have been used wherever possible, but owing to their scarcity, softer ties have had to be used on some of the more unimportant streets. With soft ties, the rails are spiked through tie plates which are deemed unnecessary where oak ties are employed. On top of the foundation, a mixture of 60 per cent. ⅜-in. stone and 40 per cent. dust is laid and tamped under and around the ties to bring the tracks up to proper grade, and to give resilience to the track, thus greatly improving running qualities. The second course of concrete is then laid thoroughly embedding the ties and base of rails. This course is of 1:3:6 mix with a screened gravel as the coarse aggregate. The track is then ready for the pavement, which is mainly granite block laid in standard fashion on a sand base with cement grouting.

In cases where asphalt paving is adopted, the paving base is poured in two courses, the bottom course being allowed to stand for a day before the top lift is poured. This will make it possible to chip off the top course more easily when the asphalt wears out and it is desired to replace it with granite blocks. The granite blocks are laid on a cushion of cement and sand and are grouted with cement grout.

Practice in Special Cases

This general procedure has, naturally, been altered in certain details in order to suit the particular requirements of the street on which work is proceeding. For example, on a certain portion of Bathurst St., it was found impossible to divert traffic for any time longer than necessary to pour the foundation. The new tracks were, therefore, laid and carried on blocks resting on the sub-grade, only every alternate tie being used. The concrete foundation slab was then poured while traffic was using the tracks. As the load was carried to the sub-grade through the blocks, there was no interference with the setting of the concrete. When the concrete had sufficient time to set, the wedge blocks between the ties and the supporting timbers were removed, allowing the ties and rails to rest on the con-



These illustrations show three stages in the track laying operations on Bathurst Street hill, Toronto and indicate the rapidity with which the work is carried out. In this instance the line is entirely new and the same speed was not called for as on rehabilitation work, where traffic is waiting to make use of the rebuilt lines. However, only a month was necessary for the track laying from the time of breaking pavement to the completion of the road, ready for traffic. The illustration on the left shows the road bed as it appeared on September 16, while three days later, as shown in the centre picture, the foundation course of concrete had been poured. Ties, rails and granite block pavement were then laid, the finished appearance of the line being shown in the right hand illustration, which was taken on October 13.

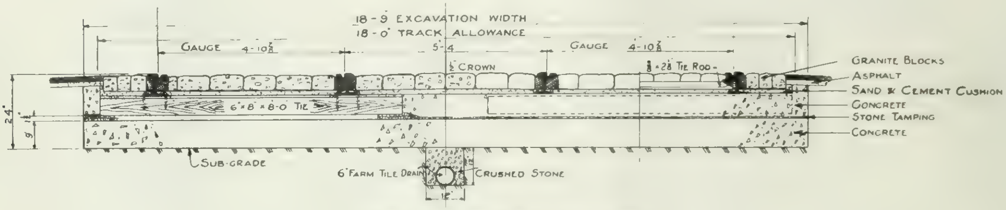
crete. The alternate ties were then inserted and the track construction completed in accordance with the method detailed above.

Pre-mixed Concrete Ingredients

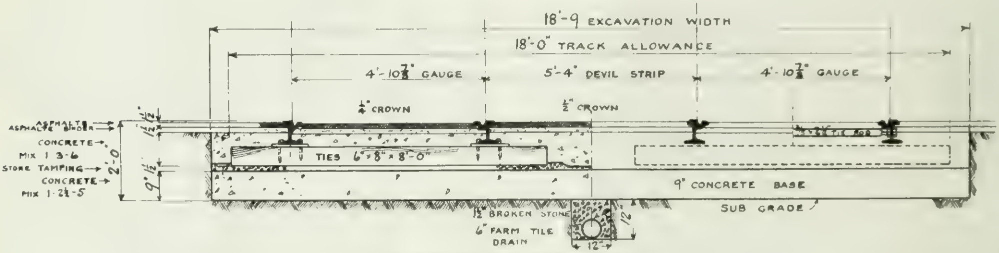
A reference has been made to the use of the batch transfer method of handling concrete material in all of the Toronto Transportation Commission's work. By this system properly proportioned batches of dry ingredients were hauled on motor trucks to the mixer. The advantages are very obvious. A large labor force at the mixer is dispensed with; the streets are kept entirely clear of materials, and batches are in readiness as often as the mixer can handle them; at the yards, where the ingredients are proportioned, a large labor force is unnecessary, as the materials are handled almost entirely by mechanical equipment. The commission has two yards where work of this character is carried out, namely, at Coxwell Ave., in the east end of the city, and at Bathurst St., in the central north part of the city. In addition there is also a large storage yard on Merton St., where rails, ties and other track supplies also come in direct by train. At the Bathurst St. or Hillcrest Yard, which has been selected as typical, there are two heavy locomotive cranes continually unloading stone and sand to the extent of 1,500 to 2,500 tons a day, which figures also represent the amount of material going out of the yards. The various materials are arranged in stock piles from which the trucks obtain their quota by means of a large fleet of Barber-Greene loading machines. These machines are of the bucket type, which lift the materials into a measuring hopper or chute, according to whether a measured quantity is desired or not. They are mounted on caterpillar treads and are entirely self-contained, so that they may be readily shifted from one part of the yard to another. The various piles of materials are as follows: 1st, crusher run (for special foundation work); 2nd, tamping material (60 per cent. ⅜-in. stone and 40 per cent. dust); 3rd, sand; 4th, screened gravel (for top lift of concrete); 5th, trap rock (for foundation slab). Each truck leaving the yard for a job carries two batch boxes, each containing 33 cu. ft. of loose material. They are filled first with the proper amount of sand and then receive the correct proportion of gravel or trap rock, as the case may be. The proper number of bags of cement are then placed on top, these being opened and dumped en route by a man travelling with the truck. In this way much time is saved and any congestion at the cement platform is avoided. The cement platform is at such a height that very little lifting of the bags is necessary in loading up the trucks. When the job is in progress, there is a continuous stream of trucks coming to the yards, loading up and leaving for the site of the work. In this way a supply of materials is made constantly available and the continuous progress of the work is not held up.

The rails which have been adopted are 122 lb. grooved girder A. E. R. A. sections, although in certain instances, 100

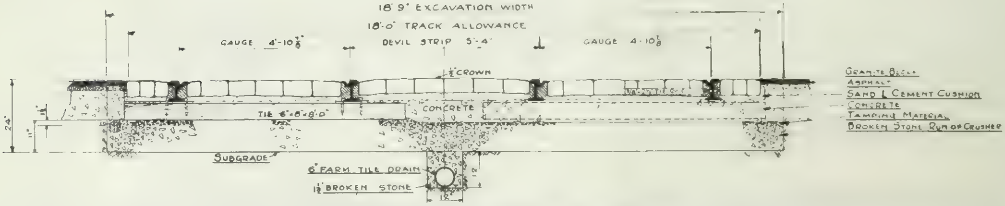
Types of Construction for Track Rehabilitation in Toronto



Concrete Base with Granite Block Paving

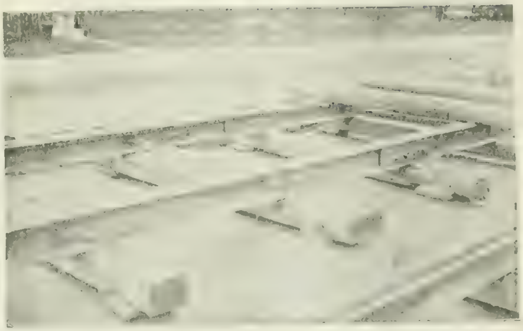


Concrete Base with Asphalt Paving



Crushed Stone Base with Granite Block Paving

The concrete materials are mixed in their proper proportion at a central yard and hauled in bottom dumping batch boxes to the mixer. This ensures accuracy of mix, saves time, dispenses with a large laboring force and keeps the street clear of stone and sand piles. Each batch box contains 33 cu. ft. of material, making 21 cu. ft. of mixed concrete.



In some cases, where traffic conditions made it impossible to wait until the concrete foundation had properly set before opening the street, the rails and ties were carried on blocks resting on the sub-grade This enabled the street cars to proceed without interfering with the hardening of the concrete foundation. The blocks are kept well outside of the line of the rails, so that there will be solid concrete beneath the points of load.

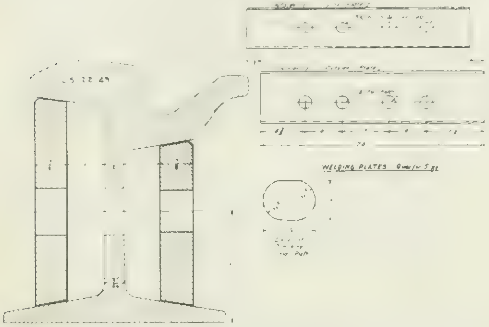
Concrete materials are pre-mixed at a central yard and distributed in batch boxes by means of motor trucks. The boxes are loaded at yard by means of bucket loaders, which accurately proportion the amount of material necessary for each batch. This illustration shows three such loaders, one for sand and two for stone, in process of filling a truck load of two batch boxes.

Pneumatic tools are made extensive use of by the Toronto Transportation Commission's construction forces. Pneumatic drills break up old concrete and pavement, while pneumatic tamping tools are employed to bring up the new tracks to grade.

New rails are thoroughly bonded by being welded together solidly. The illustration shows the welding operation in progress, the plate being bonded to the rail along its full length at both top and bottom.

lb. A. R. A. "T" sections have been employed. These rails are carried on oak or jack pine ties, 8 ft. long, 6 in. thick and 8 in. wide, and spaced at 2 ft. centres, standard tie plates being used if the ties are of soft wood. The whole track is then carried on a concrete or crushed stone foundation.

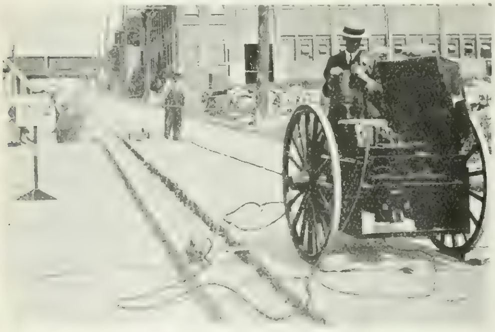
The gauge of street railway tracks in Toronto is 4 ft. 10 7/8 in. and on double track construction the commission is laying the tracks to 10 ft. 2 7/8 in. centres, giving a 5 ft. 4 in. devil strip. The rails are laid with joints opposite, whether single or double track. They are tight-butted and the joint plates are welded to the rails along the top and bottom. Tie rods are inserted every six feet.



Section of rail and bonding plates. The bonds are electrically welded to the rails as explained in the article

Electric Welding the Bonds

The bond plates used were 24 in. long by ⅞ in. thick, with four holes; see plan herewith. By means of bolts the plates were drawn tightly into position, as the first essential is a good mechanical joint. Both the plates were welded top and bottom by the Lincoln process method, which consists of laying a 9/32 special low carbon rod at the joint between the plate and rail. A dynamotor, taking current from the trolley, furnishes 400 amperes at 35 volts at the arc; a 5/16 carbon pencil is used. The arc penetrates half into the rail and half into the plate, driving in the filler rod, making a mechanical and electrical joint at the same time. This process, which is faster than the metallic welding, is made possible by the use of a copper defining bar. This bar steadies and confines the arc and makes it possible to direct the arc along the welding line. It also holds the filler rod and flux in place. By conducting heat from the weld, it prevents excessive heating of the rail and by concentrating and confining the heat at the welding line, it assures ample crater depth. After the weld is finished, the bolts may be removed. The Toronto Commission are only removing two of the four.



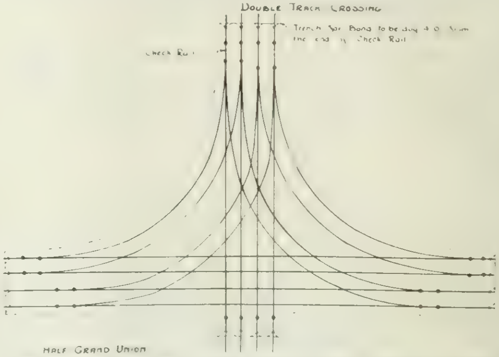
The Lincoln [illegible] outfit supplying 400 amps. at 30 volts

As the rail has to be aligned and the foundation built up to the ties before the welding is done, it has been found necessary in some cases to use two, or in special cases, all four, of the dynamotors on a section of track so as to keep ahead of the concreting gang. This was the case in doing the section of Yonge Street, from College to Queen, which section was put through in schedule time.

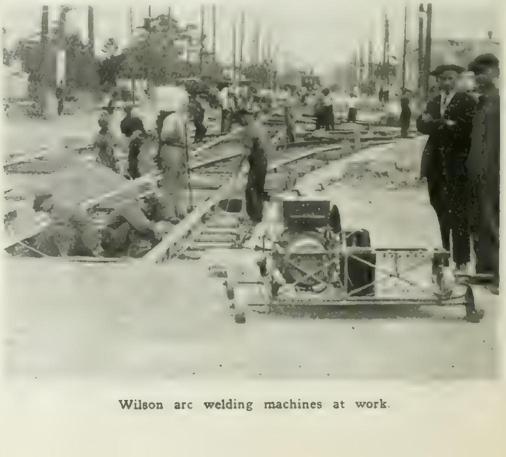
Flexible Bonding

In addition to the joint welds described above, No. 0000 arc weld cross bonds are installed every 500 ft. between the two rails of each tangent track.

The thoroughness with which intersection special trackwork layouts are bonded is of particular interest. Rail joints within the special work layout are not steel welded at the fish plates but are each bonded with No. 0000, 7 inch "U" arc weld copper bonds welded to the head of the rail. In addition to this complete bonding of the rail joints within the special work, the entire layout is shunted by a 1000,000 c.m. bare stranded copper conductor laid around and outside of the special work at the ends of the ties and crossing under all tracks four feet outside of guard rails at all points of crossing. At the points of crossing the tracks, this bond, which is locally called the "ring bond" is attached to each rail through two 72 in., copper, No. 0000, arc weld bonds having terminals at both ends. Both ends of the 72 inch bonds are welded to the base of the rails and the mid point of the bonds is thor-



Illustrating the thoroughness with which special track-work lay-outs are bonded.



Wilson arc welding machines at work.

oughly soldered to the "ring bond." All soldered connections and welds are painted.

At outlying points the same system of special work bonding is used except that in these cases the "ring bond" is 500,000 c.m.

The sketch attached gives a clear idea of how the special work bonding is laid out.

The "ring bond" allows special work to be removed for reconstruction purposes without disturbing the return circuit. Where the track return circuit has to be supplemented by special negative feeders this "ring bond" system makes an easily obtained point of connection as the track foundation is not disturbed as is the case with bonds buried under the tracks.

The copper arc weld bonds used are of Ohio Brass Co.'s manufacture. Wilson arc welding machines also supplied by the O. B. Company are used to attach the bonds.

An Effective Holiday Message

A particularly attractive Christmas message, in the form of the Christmas number of the Winnipeg Public Service News, was issued by the Winnipeg Electric Railway Company to its patrons on December 15. The spirit of Christmas at its best is the spirit of "service", and no more opportune time could have been found to tie in these two ideas—and no more effective message—than this expresion of goodwill. We reproduce herewith, in reduced form, the message, which was signed by Mr. A. W. McLimont, vice-president of the company. The reproduction necessarily weakens its effectiveness as the original was in two colors, but our readers will catch the underlying idea.

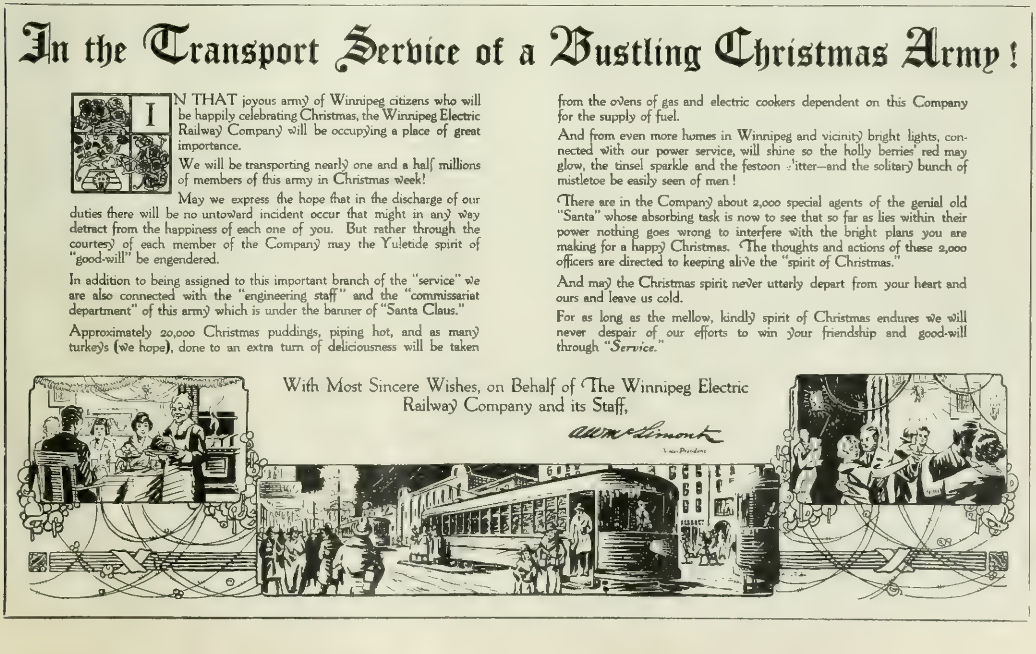
A report states that a $1,750,000.00 issue of 5 per cent bonds of the Montreal Tramways Company offered in New York recently was over-subscribed within 48 hours and that the issue had excited more than ordinary interest.

M. C. Gilman New Sales-manager

Mr. M. C. Gilman has been appointed sales manager of Electric Utility, of the Winnipeg Electric Railway Company. Mr. Gilman has recently been connected with the Montreal, Light, Heat and Power Consolidated and previously was with the Toronto Electric Light Company, the Public Service Corporation, Newark, N. J., and the Brooklyn Edison Company, New York, in executive positions. He has always been a prominent member of the Canadian Electrical Association, where he was for several years chairman of the commercial section. He also was Canadian member of the Commercial Section of the National Electric Light Association, New York. The office of sales manager, Electric Utility, is established because of the greatly increased opportunities there will be for the disposal of power due to the greatly increased supply which will be received by the company from the Manitoba Power Company's development at Great Falls.

A. M. E. U. Annual Meeting

The regular annual meeting of the Association of Municipal Electrical Utilities will be held on Jan. 26-27, Thursday and Friday. The sessions, as usual, will be in the Chemistry and Mining Bldg., Universiiy of Toronto.



In the Transport Service of a Bustling Christmas Army!

IN THAT joyous army of Winnipeg citizens who will be happily celebrating Christmas, the Winnipeg Electric Railway Company will be occupying a place of great importance.

We will be transporting nearly one and a half millions of members of this army in Christmas week!

May we express the hope that in the discharge of our duties there will be no untoward incident occur that might in any way detract from the happiness of each one of you. But rather through the courtesy of each member of the Company may the Yuletide spirit of "good-will" be engendered.

In addition to being assigned to this important branch of the "service" we are also connected with the "engineering staff" and the "commissariat department" of this army which is under the banner of "Santa Claus."

Approximately 20,000 Christmas puddings, piping hot, and as many turkeys (we hope), done to an extra turn of deliciousness will be taken from the ovens of gas and electric cookers dependent on this Company for the supply of fuel.

And from even more homes in Winnipeg and vicinity bright lights, connected with our power service, will shine so the holly berries' red may glow, the tinsel sparkle and the festoon glitter—and the solitary bunch of mistletoe be easily seen of men!

There are in the Company about 2,000 special agents of the genial old "Santa" whose absorbing task is now to see that so far as lies within their power nothing goes wrong to interfere with the bright plans you are making for a happy Christmas. The thoughts and actions of these 2,000 officers are directed to keeping alive the "spirit of Christmas."

And may the Christmas spirit never utterly depart from your heart and ours and leave us cold.

For as long as the mellow, kindly spirit of Christmas endures we will never despair of our efforts to win your friendship and good-will through "*Service*."

With Most Sincere Wishes, on Behalf of The Winnipeg Electric
Railway Company and its Staff,

A W McLimont
Vice-President

Current News and Notes

Aylmer, Que.

Mr. W. Lapensee, Hull, Que., has been awarded the contract for electrical work on three stores and four residences recently erected at Main & Bancroft Sts., Aylmer, Que., for Dr. F. W. Church, Aylmer.

Havelock, Ont.

A report states that because the electric light system of Havelock was not meeting expenses it has been found necessary to increase both the commercial and domestic rates one cent, bringing it up to six cents per kw. hr.

Meaford, Ont.

. The rate-payers of Meaford will vote on a by-law, at the municipal election in January, to bring hydro-electric power into the town.

Montreal, Que.

Messrs. J. A. Anderson & Co., 205 Mansfield St., Montreal, have been awarded the electrical contract on the gatehouse and stores of the Canadian Vickers, Ltd., Notre Dame Street E., Montreal, which are undergoing alterations.

North Toronto, Ont.

Messrs. Harris & Marson, 81A Parkway Ave., Toronto, have been awarded the contract for electrical wiring on a High School to be erected at North Toronto at an estimated cost of $160,000.

Ottawa, Ont.

Mr. S. J. Davies, 83 LeBreton St., Ottawa, has been awarded the contract for electrical work on a store and apartment building recently erected on Wellington St., Ottawa, for Mr. W. Burke, 871 Somerset St.

Outremont, Que.

The Sayer Electric Co., 87 Bleury St., Montreal, has been awarded the contract for electrical work on an apartment house on Girouard Avenue, Outremont, recently erected for Mr. E. Thompson, 1105 Bernard Ave., at an approximate cost of $35,000.

St. Marys, Ont.

Mr. A. Willard, St. Marys, Ont., has been awarded the contract for electrical work on the chopping mills of the St. Marys Milling Company, St. Marys.

St. John, N. B.

When the New Brunswick Power Company, St. John, N. B., failed to comply with the demands of its striking street car employees last summer, the strikers formed a company, known as the Union Bus Company, to operate a bus service that would give employment to several of the men on strike. Some 13 buses were finally put in operation at a cash outlay in vehicles alone, of about $15,000. The company has, however, ceased operations because of operating losses. Reports state that the public had ceased to patronize the buses to a considerable extent; also that some of the strikers have gone back to the employ of the power company.

St. Catharines, Ont.

Mr. H. C. Holmes, 30 Ann St., St. Catharines, Ont., has been awarded the electrical contract on a store and apartment building recently erected at Lake & Albert Sts., St. Catharines, for Messrs. Vine & Swan, 50 King St.

North Bay, Ont.

The Timiskaming & Northern Ontario Railway Commission has appointed a committee of engineers to make a report in three months' time as to the feasibility of electrification of that line.

Toronto, Ont.

Messrs. Bennett & Wright, 72 Queen St. E., Toronto, have secured the electrical contract on a Club House to be erected on College St., near Shaw St., Toronto, for the Parkdale & West Toronto G. W. V. Association, at an estimated cost of $55,000.

Mr. B. C. Taylor, 25 Marchmont Road, Toronto, has been awarded the contract for electrical work on a store and apartment building recently erected on St. Clair Ave., near Vaughan Rd., for Mr. W. B. Isbester, 209 Westmoreland Ave., Toronto.

Mr. W. F. Clarke, 62 Dundas St. E., Toronto, has secured the electrical contract on three stores being erected at Bloor St. & Beresford Ave., Toronto, for Mr. S. Winesanker, 3040 Dundas St. W., at an estimated cost of $36,000.

Vancouver, B. C.

Officials of the British Columbia Electric Railway, who have been busy altering their system to conform to the new rules of the road which comes into effect New Year's day, announce tat they have everything in readiness and that the change over will be made at 6 a. m. Sunday morning. Owing to the New Year's Eve traffic the change could not be made at midnight. The new rule means that all vehicles meeting will pass on the right instead of on the left as heretofore.

Verdun, Que.

Messrs. J. A. Anderson & Co., 205 Mansfield St., Montreal, have secured the electrical contract on a ten-room school being erected at Melrose & Verdun Aves., Verdun, Que. at an estimated cost of $100,000.

Victoria, B. C.

A delegation from Vancouver, New Westminster and Victoria, B. C., recently waited on the provincial authorities at Victoria to show why one-man cars should not be operated on the lines of the British Columbia Electric Railway. The result was that such cars may be given a fair trial and if, at the expiration of that time, they are deemed unsatisfactory or unsafe the question could be re-opened.

Westmount, Que.

Mr. H. R. Cassidy, 225 Regent Avenue, Montreal, has secured the contract for electrical work on a new bank building recently erected at Victoria & Sherbrooke Sts., Westmount, for the Canadian Bank of Commerce.

Winnipeg, Man.

The monthly returns of the Winnipeg Hydro-electric System shows that for the month of November the receipts for electric light and power were $166,996.75, an increase of $464.67 over November, 1920.

Winnipeg, Man.

Gross earnings of the Winnipeg Electric Railway Company for October, amounted to $454,224, an increase of $1,123 compared with the corresponding period last year. Operating expenses and taxes amounted to $324,263, against $337,881 last year. Gross earnings up to Oct. 31, 1921, total $4,550,250, against $4,285,817, in the preceding year.

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Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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The Chippawa Development—First Unit of 650,000 H.P.

It is a human characteristic to follow the line of least resistance. That explains why so many people in this world are "knockers." It is easier to criticize a condition than to take the trouble to investigate the cause underlying that condition.

This explains in a measure, no doubt, some of the things that are being said about the Chippawa development, the first unit of which was officially turned over during Christmas week. For example, one of our foreign contempories waxes almost poetical in declaring that "the Hydro Commission of Ontario, lured on by ambition, has fallen into a pit of its own digging." This "pit" neither refers to the canal nor the forebay, the items that naturally occur to one in this connection. The writer is referring, figuratively, to the costs of the Chippawa development.

Now, there is no one in Ontario—or for that matter in Canada—who does not regret that the cost of the Chippawa development is as great as it is. Cheap power is a wonderful asset to any district and if, as seems probable, power rates in Ontario have to be revised upwards, it will be a matter of regret. It is neither fair nor reasonable, however, to charge this condition to the Commission's ambition—that is a superficial viewpoint that savors just a little bit, we think, of satisfaction at the consoling thought that things have turned out rather worse than they might have done.

The Chippawa development is about the biggest thing of its kind in the world. Perhaps we could defend the statement, "the biggest." It was carried through by Canadian engineers—Canadian brains—and considering the number of problems without precedent that were encountered, the criticism of results, from an engineering viewpoint, have been surprisingly small and it does seem to us that under these circumstances it would have been a more or less gracious act on the part of our contemporary to have said a word of commendation in connection with the whole undertaking. However, this matter aside, we don't see that the statement regarding the Commission's ambition is borne out by the facts.

* * *

It may have slipped from the memory of the writer of the article to which we refer, that from August 4, 1914, Canada was at war. During the next four years Canada was straining every nerve to supply men and munitions to win that war. In 1915 it became apparent that our power supply was inadequate. It was only when we were confronted with this condition that the ambition of the Hydro-electric Power Commission of Ontario manifested itself in a desire to supply the province with, at that time, her greatest need. In considering the question of the high cost of the Chippawa development, we must never forget, therefore, that two factors entered very prominently into these figures. First, the scheme was conceived and initiated at a time when construction costs were at their peak and, second, speed was the most essential element entering into the construction. Looking back on the whole situation through a distance of five or six years it doesn't take a particularly clever man to see that if the start on this construction work had been delayed until the present time, the cost would have been very much less.

It is not the province, nor the desire, of the Electrical News to defend any unnecessary cost in connection with this work or any engineering mistakes, where it is shown that these exist. We do not even raise the question as to whether this work might have been carried on more efficiently or with better results under private than under municipal management. The basic fact is: we needed power—it was a matter of life or death to us at a time when the country to which our contemporary belongs had not yet decided whether or not they were interested in the war. Further, it is an open question whether private capital could have been induced to undertake a work of this kind under the unsettled conditions prevailing at that time.

* * *

It may, of course, be argued again that it was highly improbable that a work of this nature could be completed before the ending of the war. This again is speaking after the fact. In 1915 none of us knew whether the war would last three years or thirty years and, in any case, this further fact must be recognized: that the moral effect of an enterprise of this nature, indicating the determination of Canada to continue the struggle as long as might be necessary, with every available resource, cannot be over-estimated.

The cost of Chippawa power is higher than we should have liked. Let us admit it. It is highly improbable that the first unit will take care of the fixed charges without an increase in rates. It would be foolish to expect it. It is even improbable that the completion of the first set of five units will do much more than carry the enterprise, even if the rates are slightly increased. We believe, however, that the Commision have stated their confidence in their ability to complete the total development of 650,000 h.p. at a cost that will enable them to establish at that time rates equal to those at present existing in Ontario, and probably reduce them. This, as we understand it, is the actual "ambition" of the Ontario Commission which, when it is considered that Ontario power rates are among the lowest in the world, must be admitted as a worthy one.

The Contribution of Electricity to Our General Industrial Development

A significant statement in the recent annual report of the Southern Canada Power Company, Ltd., is to the effect that in the past three years seventeen new industries brought into the Eastern Townships of Quebec by that company have invested $10,000,000 of capital.

Do we, even in the electrical field itself, sufficiently appreciate our possibilities in attracting industries to Canada? How often do we hear it said "O, after all, the cost of the power in most manufacturing operations is too small to be a real factor in determining location?" But, in saying that, don't we overlook the inestimable value of the class of service rendered by electric power—which is out of all proportion to its cost?

The actual fact seems to be that we have all fallen into the error of emphasizing the cheapness of electric current instead of its dependability and utilitarianism. We have tried to sell on a basis of "cost" rather than "quality". Let us forget all about cost and talk "indispensibility." If the business man wants electricity in his factory, if he is convinced that he can't get along without it, he won't waste his own time or that of anybody else talking cost. He wants service—good dependable service—a power agent that will undertake to do a job and do it every day of the 365: cost is a detail. The Southern Canada Power Company has brought ten millions of capital into the district they serve, during the past three years—not because power was cheaper there than elsewhere but because they had much more convincing arguments than low cost. They talked the convenience, the advisibility, the necessity of electric service, its dependability and finally, its ample supply with a guarantee for the extension of future years. On these arguments we have no serious competitors.

The electrical industry as a whole shows a tendency to forget that the modern conception of merchandising is "service first." Our energies should be concentrated on bringing the man and woman on the street into that attitude of mind where they "want" electric service because they are convinced they "need" it. The sale of electrical appliances and equipment would follow automatically and the price would scarcely enter into the matter at all.

Our Wonderful Natural Resources

Attention is now being directed toward the country's natural resources as never before, since it is generally recognized that only by a more wide-spread utilization of Canada's undeveloped lands, mines, forests, water-powers and fisheries can present day economic problems be solved.

The Natural Resources Intelligence Branch of the Department of the Interior has published a map showing the leading natural resources of each province. In Nova Scotia mixed farming, mining and fishing predominate; in Prince Edward Island fur-farming and agriculture. New Brunswick has large areas of timber, while mixed farming and fruit growing are outstanding interests. In Quebec may be found a wealth of timber for pulp-wood, also minerals such as asbestos, graphite and molybdenite, while in Ontario somewhat similar opportunities exist.

In addition to information on natural resources, the map shows all railways and trade routes. An interesting and valuable feature is a series of comparative diagrams illustrating the production and exports of the various provinces. A copy of the map may be obtained free of charge upon application to the Natural Resources Intelligence Branch, Department of the Interior, Ottawa.

A Diesel-Electric Plant That Has Made Good in the West

By S. H. EXCELL*

Just west of the Rockies and standing guard at the north end of the Okanagan Valley, is the town of Vernon, B. C., the snug centre of the famous apple growing district.

In these times when municipal ownership is so much to the fore it will not be amiss to recognize what has been a most successful municipal undertaking and to describe how thoroughly Diesel engines have proven their outstanding economy and ability to serve some 4,000 of a population, continuously and well.

From 1902 to 1908 a steam unit gave faithful service and in the latter year, the advertised economy of the Diesel engine was so marked, the Municipal Council decided to install a 4 cylinder, 200 h. p. unit to take care of a constantly increasing load. This machine was purchased from the old established firm of Mirrilees, Bickerton & Day, Ltd., Stockfort, England, and is of the vertical or marine type direct connected by flexible coupling to a Westinghouse generator and exciter of equivalent capacity. To indicate the servicable qualities of this machine, which has been in constant service ever since, it is interesting to note that quite recently during a thorough examination all the major parts were found to be practically without wear, while the wear on minor parts amounted to only a few thousandths of an inch. This machine today is as capable of carrying continuous full load as it was when first installed. Load conditions became such that in 1912 a further extension to the plant became necessary, so the steam plant was shut down for good and a 500 h. p. Diesel unit installed in the new wing of the power house.

This machine is also of the 4 cylinder, vertical or marine type and was built in Sweden by the Alstiebolaget Diesel Moterer Co. The alternator and exciter were furnished by the Canadian General Electric Company and are coupled direct to the engine shaft.

The switchboard equipment throughout was supplied by the Canadian Westinghouse Company and consists of generator panels, light and power panel, meter panel and street lighting control panel. Here again the installation of the larger unit was so good that recently, under special micrometer test taken between the crank webs, the limit of wear showed a discrepancy of only some .003". As presently operated, the larger unit carries the load for, from 18 hours to 24 hours daily, according to season, while the smaller takes the night and week-end load and is kept available for the peak load.

The vertical type Diesel has proved to be highly satisfactory for continuous operation, the almost entire lack of wear and vibration showing the degree of balance attained

The electrical equipment has been very satisfactory and, like the prime movers, is still good for many years of active service and "juice" extraction. What probably has added to the success of this plant is the routine adopted for plant operation and maintenance, and the justifiable pride of the operators for their charges. A definite schedule of inspection and repairs is followed out and each part in turn is examined and, where necessary, adjustments made. Nothing is overlooked; from the roof down to the pipe tunnel below the floor level a constant search to eliminate trouble is carried out. In the machine shop and spare room, the same thoroughness prevails. All supplies are in bins or cupboards available for instant use.

The entire plant is very efficiently lighted, while for artificial lighting high candle power nitro lamps in semi-indirect fittings are used, giving well diffused illumination. Ventilation is amply taken care of, under all seasonal conditions. The power house is of ferro concrete construction and of a pleasing design.

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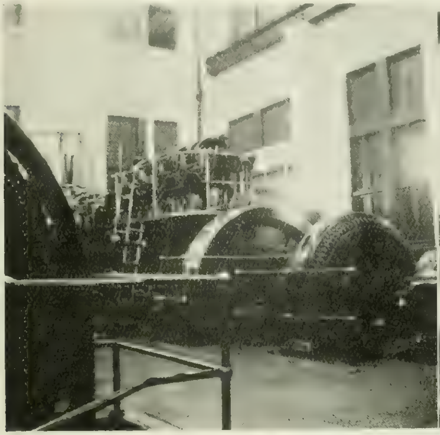
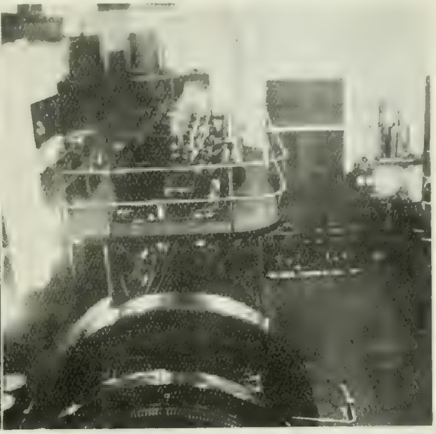
* City Engineer, Vernon, B.C.

Engine Room details

Fuel oil is pumped by hand from storage tanks convenient to the nearby railway track to service tanks in the engine room, and so placed as to give a gravity head to the fuel supply to each engine. Cooling water is supplied from the city water system or from an emergency connection to a never-failing creek contiguous to the plant. Lubricating oil after passing through the engines is filtered through two Burt oil filter units. These filters are kept at good temperature by steam obtained from specially designed generators on the exhaust lines from the engines.



200 h.p. unit, Vernon, B.C.



500 h.p. unit, Vernon, B.C.

It is of interest to note these generators supply steam and hot water, not only to the filters but also to the fuel oil heaters and the jackets of the smaller engine to facilitate starting in below zero weather. The engines are arranged so that air could be supplied in an emergency from the bottles of either engine, but this has never been called into use, each engine starting and picking up promptly.

Cleaniness is paramount and to give the electrical equipment the best possible care, a motor driven "Curtis" air compressor is installed. This machine, besides blowing out the alternators and exciters, is put to many uses, such as clearing lubricating pipes, fuel pulverizers, blowing down switchboard, etc.

The operation of the plant is carefully logged daily, and besides the reports necessary to record output, expenditures and revenue, etc., close check is kept on all such terms as taking up of bearings, matters pertaining to lubrication, valve settings, indicator cards, etc.

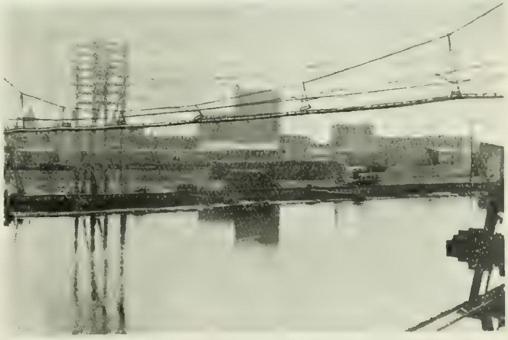
For the year ending December, 1921, the operating expenditures and overhead were as follows:

Interest and sinking fund and insurance	$17,755.67
Fuel oil	13,515.00
Salaries and day labor	7,800.00
Lubrication and sundries	1400.00
Plant maintenance	1500.00
Output	1,068,283 kw. hrs.
Load factor	22.9 %
Cost of fuel per kw.h. at average cost of 14.64 cents per gallon would be	1.24 cents
Total annual cost of 1 kw.h. at switchboard	4.11 cents

Aerial Construction for Carrying Heavy Cable

The somewhat unusual aerial construction shown in the two cuts was recently installed for the Ottawa Electric Company to carry a heavy power cable across the headrace; the previous cables had been laid as subaqueous cables in the bed of the race. Owing to local conditions, it is necessary to empty this each time a cable is laid; this means the closing down of the power station temporarily, and the load has to be carried by reserve steam plant, which is not only very costly, but inadequate.

To avoid closing down, it was decided to run the cable aerially over the head race, a distance of approximately 150 ft. The cable is carried over on a form of catenary suspension in practically a straight line. A main messenger cable of ¾ in. diameter steel rope supports six "T" hangers, which in turn support two cable messengers of ⅜ in. strand and a third messenger which is supported on inverted trolley ears and is used for the cableman's aerial car, so that inspection and repair work may be easily carried out.



Carrying heavy power cable across headrace of Ottawa Electric Company

Each "T" hanger is tied to a ⅞ in. diam. steel rope wind or sway brace on each side, so that the cable is prac-

[illegible] ported in all conditions of wind and weather.

The cable itself is a four conductor No. 00 B & S gauge, lead covered and paper insulated, for 13,200 volts, overall dia. 2.79 in.: it weighs 11.1 lbs. per ft., and is supported from the cable messengers by aerial cable rings placed 12 inches apart. There is provision for another similar cable on the same structure.

Close-up view of heavy power cable

The cable was installed by the Northern Electric Company, and is part of a large improvement to the substation and transmission equipment recently completed under the direction of Prof. Herdt.

Public Utility Outlook Is Encouraging

It is generally conceded that the year now opening will bring in its course the beginning of the long-heralded boom in electric light and power plant construction. The water power act is begining to function, money is once more coming to a reasonable level, the power load is commencing to creep up, new customers are taking service, and costs of power equipment and building materials are being reduced. As an indication of this approaching activity, a prominent firm, Engineers and Constructors of New York and Chicago, advise that they have secured important contracts from the Duquesne Light Company of Pittsburgh and the New Orleans Railway and Light Company.

The work of the Duquesne Light Company includes the installation of the second unit of 60,000 kw. at the Colfax Power Station, together with three additional substations along the company's lines in the Pittsburgh district. The Colfax Station is designed ultimately to be one of the largest steam stations in the country, containing six 60,000 kw. units. The first unit was put in operation last year and the installation of the second unit now authorized is a part of the company's plan to provide additional facilities as the demand for power increases. The New Orleans Railway and Light Company is proceeding with extensive additions to its power plant and distributing systems, including the installation of a 20,000 kw. turbine and auxiliaries.

Street Lighting Developments

The December meeting of the Toronto Chapter of the Illuminating Engineering Society was held on Monday evening, December 19th, in the Chemistry & Mining Building. Mr. M. B. Hastings, who has been in close touch with street lighting developments for many years, gave an illustrated address on that subject.

According to a statement of one of the provisional directors of the Prince Edward Light and Power Company, incorporated at the last session of the Legislature with a $2,000,000 capital, the development work proposed may not go forward unless an extension of time can be obtained.

A. M. E. U. Convention Program

Thursday, January 26

Morning.

Registration at the office of the Hydro Electric Power Commission of Ontario, 190 University Avenue.

Afternoon. 2.30 o'clock, in Room C26, Chemistry and Mining Building, University of Toronto (College Street at McCaul Street).

President's Address.

Reports.

Election of Officers for 1922. Ballots will be distributed at the time of registration, and will be deposited at the beginning of this session. The scrutineers will auuounce the results of the election before adjournment of this session.

Illustrated Talk, "The Nipigon Development," by T. C. James, Municipal Engineer, Hydro Electric Power Commission of Ontario.

Evening. 6.00 o'clock, at Bingham's, 84 Yonge Street (just north of King Street).

Address, "Co-operation," by F. A. Gaby, Chief Engineer, Hydro Electric Power Commission of Ontario.

Tickets may be obtained when registering. Subscription $2.00.

Friday, January 27

Morning. 9.30 o'clock.

Paper, "The Effect of Underloaded Transformers on System Power Factor," by G. F. Drewry, Municipal Engineer, Hydro Electric Power Commission of Ontario.

Paper, "The Measurement of Kilovolt Amperes for Power Billing," by S. L. B. Lines, President, Chamberlin and Hookham Meter Co., Limited, Toronto.

Discussion.

Afternoon. 2.30 o'clock.

Paper, "Further Developments in Rural Power Distribution," by J. W. Purcell, Farms Engineer, Hydro Electric Power Commission of Ontario.

Discussion.

The Mushamush Hydro-Electric Plant

A Scheme Undertaken by the Nova Scotia Power Commission Which, While Small, Conforms to Present-Day Standards of Efficiency, Simplicity and Economy.

By K. G. CHISHOLM
Assistant Engineer, Dominion Water Powers Branch.

On October 1st the Nova Scotia Power Commission put in operation a reconstructed development on the Mushamush river near Mahone, which by contrast with the original development strikingly illustrates the present practice of simple, sturdy, hydro-electric units of the vertical, direct-connected type with high efficiency, even at comparatively low heads. The new development, although small, is considered to conform to the present-day standards of efficiency simplicity and economy.

Previous to the present development a plant at the same site owned and operated by the Lunenburg Gas Company, supplied the lighting requirements of Lunenburg with night service only. In 1920, a request for current was received from the municipality of Riverport. In addition, West LaHave, Mahone, Blockhouse and Bridgewater, were in communication with the Commission and it became apparent that there were existing and future markets for power in the district considerably in excess of the available sources of supply, a condition which, under the Provincial Water Power Act, the Power Commission was authorized to meet in the way it deemed most advisable.

After careful study of several alternative propositions, it was decided to buy out the property and rights of the Lunenburg Gas Company on the Mushamush river, including among other items their small hydro development near Mahone with the storage dams and flowage rights pertaining thereto, as well as their transmission line to the outskirts of Lunenburg, and to utilize as much as possible these rights and properties in the construction of a new plant more liberally designed to meet the present and future demands of the district.

The company's development near Mahone consisted of a head dam with timber flume built into the dam, and wooden power-house immediately below. The dam about 400 feet long at highwater and 24 feet in maximum height consisted of a central timber spillway section with an earth embankment at both ends. The turbine installation consisted of a pair of 27 inch, horizontal, S. Morgan Smith cylinder gate wheels mounted on the same shaft and discharging into a common steel plate cylindrical draft tube. They were set in the bottom of the timber flume in a timber draft chest made up at the site. The shaft projected through the end of the flume into the power-house and the generator on the upper floor of the power-house was belted to a 6-ft. diameter cast iron pulley on the turbine shaft. The wheels were rated at 386 h.p., 280 r.p.m., under 24-ft. head, and the Westinghouse 3 phase generator at 200 kv.a., 3500 volts and 600 r.p.m. The exciter was belted to the generator shaft. This small plant had been in operation for 13 years and had given reasonably good service.

In connection with the studies made by the Commission's engineers, a test of the old plant was made in February 1921. The results of this test may be interesting as being representative of small plants of its class. A close inspection after the test showed the wheel and bearings to be in good condition, although some play on the bearings was observed. As far as the wheel and mountings were concerned, it was apparent that the full original efficiencies of the wheel should have been obtained, but in fairness to the manufacturers, and in explanation of the low efficiencies actually obtained, it should be stated that the tail-race conditions immediately under the turbine were not good and piling up of the water took place, with consequent loss of operating head. The extent of this piling up could not be ascertained as it occurred around the draft tube beneath the flume. The average results of the tests made are given in the following summary.

Gate	Head	Speed	Discharge	Turbine Effcy.
Full	21.8	275	159	63.0%
¾	21.9	280	139	56.6%
½	22.1	280	99	46.2%

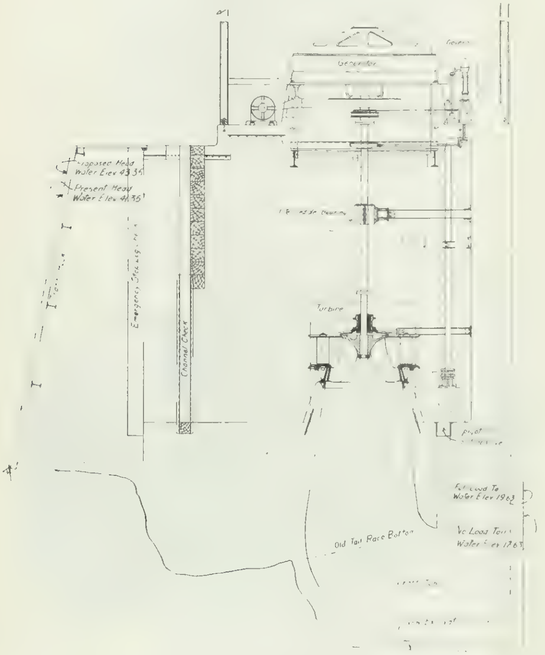
For the new development it was decided to use the same head of 22 feet, utilizing the existing dam, but instead of the old timber flume and power-house to build a new plant with better construction throughout and with a larger turbine in a more permanent and efficient setting. The turbine was selected for a head of 24 feet as it is the intention to increase the height of the dam by two feet when the load becomes large enough to warrant doing so.

Exterior view of power house of the Mushamush hydro-electric development in Nova Scotia

In selecting equipment for the new plant, it was necessary to bear in mind that the new development must be begun and carried to completion as early as possible. Some consideration was given to utilizing a high speed runner of the Nagler type but for various reasons this was not entertained, particularly when it was found that the S. Morgan Smith Company had already constructed a wheel suitable in every respect, which could be shipped on short notice. It was also fortunately learned that the General Electric Company had under construction in their works at Erie, Pa., a vertical shaft water-wheel generator of suitable speed and capacity for direct connection to this turbine.

The general layout of the new plant is shown in the figures presented herewith. It includes a concrete flume with a quarter turn flaring draft tube moulded in the solid concrete of the foundation. The setting is of the vertical type with ring gates and cover plate supported on a concrete pedestal in the flume bottom, and with runner, shaft and generator rotor supported by a General Electric spring thrust bearing supported on the generator stator. The circular pit beneath the generator permits inspection of exciter, governor pump, governor fly-ball and brake pulleys mounted also on the turbine shaft. The braces from the turbine cover plate to the flume walls, as well as the intermediate guide bearing supports and the brake supporting frame, are bolt fastened and removable, so that if necessity should arise the turbine runner may be hauled up through the opening in the power-house floor within the generator pedestal.

To close off the water from the flume a timber gate and hoisting mechanism is provided in front of the power-house, and for safety's sake emergency stop-log checks are also provided. A flap valve permits of unwatering the flume below the level of the turbine gates. Access to the interior of the flume can be had through a trap-door in the power-house floor and iron ladder rungs in the flume wall.



Section of power house showing the layout of the hydraulic and electric units

The flume is of reinforced concrete 12 feet 6 inches wide by 33 feet long inside dimensions. A reinforced concrete deck forms the power-house floor. The weight of the generator, shaft and turbine runner is carried on an I beam resting on the flume walls.

The rating of the new hydraulic unit for 24 feet head is 825 h.p. at full gate and 180 r.p.m. The generator rating is 750 kv.a. at 80% P. F., 6600 volt, 3 phase, 180 r.p.m.

Although no opportunity has yet arisen for testing the new plant, the guaranteed turbine efficiency curve runs from 73% at half-gate to 88% at .95 gate, dropping off to about 80% at full gate. This is in sharp contrast to the efficiencies obtained from the old plant. The generator efficiencies are high, ranging from 91.5% at full load to 88.5% at half load, at 80% P. F.

For reasons of economy and speed in delivery of equipment, a standard horizontal shaft exciter is used, belt-driven from the main shaft by means of an idler bolted to the under side of the generator stator frame and a quarter turn in the belt. Undoubtedly from a purely mechanical standpoint, either a belt-driven vertical exciter, or an exciter direct-connected to the main shaft would have been preferable, but economy and more particularly speed of delivery, decided against them. Not only would a direct-connected exciter have been expensive but it would have held up delivery of the generator which was already under construction. Furthermore, the Commission was already in possession of a horizontal shaft exciter of the proper rating and this was accordingly used. However, the change to a vertical shaft exciter can be made if found desirable at any time. Some trouble has been experienced with the exciter drive, first in the idler pulley and then in the belt itself, due to stretching of the new belt. This has now been overcome and the drive is operating quite satisfactorily with a leather belt.

For the sake of economy, the power-house was made as small as possible, consistent with properly housing the machinery. Its outside dimensions are 22 ft. by 24 ft. 2 ins. It consists of a framework of 2 x 6 timber covered on the outside with cement stucco laid on Bishopric-board and on the inside with gypsum fibre-board, the whole giving a building cheap, fire-resistant and easily constructed. The roof covering is of red "Everlastic" asphalt slate shingles. The building presents quite a creditable appearance as the illustration shows.

The use of the old site for the new development necessitated a shut down and a cessation in the delivery of power. Every effort was made to reduce the period of shut down to a minimum and speed of construction was an essential of the work. Work was commenced on the morning of August 10th and on October 1st the new plant was delivering energy to the line. Furthermore, the two municipalities supplied were without lights for only one night, on the 10th of August.

The old plant was shut down at midnight of August 9th and immediately unwatering sluices were opened at the head dam. At daybreak a gang had commenced to dismantle the power-house. By seven p.m. exciter and generator had been moved by hand to the site of a temporary plant 150 feet away and connected to a steam engine and boiler already hauled to the job and the generator rewired into the line. Except for the fact that exciter trouble developed, the temporary plant would have been in operation that same night. As it was, current was turned into the line at dusk of the following evening and the people of Lunenburg, who had been prepared to go without lights for the whole period of reconstruction, actually were deprived for only one night. On a job large enough to warrant the presence of adequate apparatus, this would be no feat worthy of mention, but considering the manhandling of heavy machinery necessary under the circumstances, it was considered very satisfactory. It is further of interest to note that the initial schedule of 45 working days was realized.

The costs of the various phases of the work which were very closely followed and carefully distributed, are unfortunately not available at the date of writing, but can be furnished later. The total cost is, however, within the estimate of $48,000.00.

Both the design and execution of the work were carried out by the Commission's own engineering and construction organization, under the immediate direction of Mr. Harold S. Johnston, hydraulic engineer of the Commission, with the writer as engineering assistant and instrument man during the period of reconstruction. K. H. Smith is chief engineer of the Commission, which consists of Hon. E. H. Armstrong, chairman, R. H. Mackay, secretary and F. C. Whitman, commissioner.

Selecting and Training Salesmen

The Most Important Factor in the Electrical Industry to-day—Health, Character Deportment, Reputation, Ambition, Self Confidence

One of the major problems facing sales managers to-day is building up an efficient sales force to secure orders. Sales organizations are being subjected to the acid test; some of them will fail to survive that test. We have passed through four or five years recently when men who were called salesmen did not have to sell at all; they became very soft in their ideas of work, yet they made wonderful sales records. Now times have changed; order-takers are of no use now.

Get Down to Hard Work

It has occurred to me during the last six months to a year, carrying our share of worry as to business conditions, that there are many men who have got a lot of wisdom but do not know how to apply it. They do not realize the vital application of it, and that is in the hardest kind of work. Especially to salesmen who have had five years of easy going it is hard to realize that they have got to get down to hard work or they will not stay in a sales organization very long.

The New Conditions

The quicker we all realize that prosperity depends on the action of our own self-starter the better. A good many people are just waiting for something to turn up, even sales managers. To my mind there is nothing "going to happen" until you make it. Instead of the men going out on the 9 o'clock train they will have to go out on the 7 o'clock if they are to succeed, and instead of coming in Thursday night or Friday noon, they will come in Saturday morning—if they are lucky. Those are the new conditions that we are facing.

Memorize This

I want to convey this idea; it is not necessary to tell most men these things, it is necessary to "sell" them. In our organization we never tell a salesman to do something. We "sell" the proposition. That is the only way to get the proper co-operation and spirit. The art of selling is the art of buying. What do I mean?—well, the amount you sell depends on the amount of confidence you can buy, the respect you can buy from the prospective customer. I think that is an important principle to have the sales force memorize.

Obtaining Salesmen

Now where are we going to get our salesmen? Our experience is that we get our best men through our present sales force. Those men know the policy of the company, they have confidence in the company, they know the calibre of men the company want, and they have seen in action the men that they are going to send in to apply for the position. That is something you cannot do as a general proposition. They know whether he plays pool in the hotel until 2 a.m. or poker until daylight. They know his characteristics through working with him. I emphasize that, because looking back over my experience during the last thirty years I find that the best salesmen it has been my good fortune to secure came through the salesmen we already had.

The Man in Action

You will not buy an automobile unless you try it out, but there are many hundreds of salesmen employed by sales managers who have never seen them in action. A man comes to your office, naturally he is at his best, but that does not tell you what he will look like in Peterboro or Montreal or Vancouver. His nails are clean and his shoes are shined. We did the same ourselves years ago. The important thing is to see the man in action in his regular working form, day in and day out, get a line on his characteristics, how he stands up under the test of the three a.m. bus, and the one old kind of pie and no cream.

The Other Fellow's Salesman

The next channel is from the salesmen that canvass you for orders; and that is a good channel. "Do you mean to tell me you would deliberately employ one of my salesman?" someone may ask; I certainly do. If you say that is not a fair proposition I do not get your point of view. If my salesmen can make more money with you they will go with you. Therefore I am never too busy to see a canvassing salesman. The bank manager can wait, but this man may be the one I need as the corner-stone of a certain portion of our sales force.

I believe the successful sales manager is the one who is never too busy to see a canvassing salesman. If I am in a conference which would make it necessary to keep him too long, I go out and see him for a moment and apologize and make an appointment.

From a Great School

I spent twenty years with the National Cash Register Co. —Mr. Paterson, the president of that company, is known as a wonderful leader. We were in a convention of the sixteen sales managers of the North American continent. Mr. Paterson came in and remarked "these are the sales managers, yes; now just what do you gentlemen do for the high salaries you get?"

Well, it was kind of sudden. One chap stood up and said "I keep my eye on the territory, I see that the offices are kept nice and clean."

"And you?"

"I check up the accounts and payments and consignments—"

Well, I was thinking fast, it was coming close to me, I said to myself "these boys are not thinking right," so when he came to me I said "I employ and train salesmen." I was with the N. C. R. for twenty years.

Looking Them Over

I would have lost the opportunity to secure choice men had I been too busy to see salesmen. Often a man has come in and although I did not need him at all, he made an impression, I talked to him fifteen or twenty minutes, asked if he would mind coming in again day after tomorrow—next week,—I wanted to get another slant on him. They never act exactly the same twice in succession. I asked him,—"Now just tell me how much money you make and how much you would like to make. It may be that you are fitted for this business. I am going to find out in the next fifteen minutes if you are."

From the Retail Store

Another channel is the retail store. We have secured some excellent men who were retail store clerks. There is a field where you will find ambition; also, it is a field where men are not over-paid. An illustration; we had had difficulty in getting our devices in retail stores. Our time-recording division salesmen had been trained to interview manufacturers and factory men, but they fell down on the stores. I discov-

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*By F. E. Mutton, vice president and general manager International Business Machines Co. Ltd., Toronto, in "Business Methods."

[illegible] did not know the language [illegible] had met [illegible] had never been in that store, [illegible] I looked [illegible] found a young man who was head clerk in one of the large hardware stores in Hamilton, snappy, well-dressed, knew his job or he would not have been head clerk. I brought him to Toronto and employed him. We had to teach him the time-clock business as it related to the retail store; I said to him "Now you will have to go into the factory and put on a pair of blue jeans and work from 7 till 5.30 for two weeks, for which you will not get any pay."

"All right," he said, proving his mettle.

I was only testing him really, but that was his mechanical training. The first month that young man was out in the Hamilton territory he sold eighteen machines to eighteen stores. That was good work. He knew the atmosphere and the language.

The Unemployed Man

The weakest source is advertising for salemen. I do not believe it is good business or sound policy to hire a man who is out of a job. That, perhaps, sounds severe, but there is generally some reason why he is out of a job, and it is difficult to get at the true reason. If you are going to put up a "Safety First" sign get a salesman who is in a position.

Now, I want to put before you in this graphic way, these principles:

Get Them Clean—Mentally, Physically, Morally, Spiritually. That to me is "The Bible" in hiring salesmen. There is no one of these things that you can afford to overlook. And you can test them all out in your interviewing.

Mentally.—The salesman who will consume time telling those stories that we sometimes hear is not clean mentally. The results show physically and morally.

Spiritually.—This is very important. Sometimes we meet a man who does not believe in such things as churches. I am not preaching a sermon, but I do know the value of that element; we all do.

Then I would like to add **Keep Them Clean** as to the environment they live in.

Organization

In my opinion the following elements come under the head of organization in a sales force: **Employing Men; Training Men; Supervising Men; Promoting Men; Firing Men.** If we are capable of the first four, we will not have to worry about the last.

Qualifications

As to qualifications here they are:—**Health, Character, Deportment, Reputation in Own Neighborhood, Guarantee Bond, Manner, Ambition, Confidence in Himself.**

I have a chart on my desk that is always ticked off 100 per cent before a man is taken into our organization. Health is most important. If a man has not got 100 per cent health he is anchored. A lot of talks have been made on salesmanship; to me salesmanship is the combination of a lot of qualities. Health is the foundation.

Our company spends a good many dollars a year taking care of the health of our organization. We talk to them of what to wear, what to eat, etc., etc. A lot is wasted but some gets home and it does a lot of good. I venture to say when you meet one of our salesmen you find he is "in the pink." If he is not, he will not go out, they are trained not to.

Foundation of Everything

When a salesman approaches a prospect, one of the most important things in getting that man's order is the salesman's health. Selling is largely a matter of domination. You need all the health and energy at your command to dominate some people; if you are only feeling about 70 or 80 per cent fit the buyer will do the dominating. Health is the foundation of everything. Take personality, the salesman's greatest asset. You cannot see personality, you just sense it. It is a thing you cannot define, and the greatest element of personality is health. His eyes are bright and his step springy, and he thinks just a little faster than his prospect; he cannot do it unless he has 100 per cent health.

Supervision

Then **Supervision**. I think lack of supervision is one of the weak links in our work. Every man needs it. Let me illustrate. The chain is—**Salesmen, Sales Agents, District Managers, Sales Managers, General Managers, President.** Does it stop there? No, it goes on—**Executive Committee, Directors, Shareholders.**

I would like to make this subject clear.

Who supervises Salesmen? The Sales Agents.

Who supervises the Sales Agents? The District Managers.

Who supervises the District Managers? The Sales Manager.

Who supervises the Sales Manager? The General Manager.

Who supervises the General Manager? The President.

Who supervises the President? The Executive Committee.

Who supervises the Executive Committee? The Directors.

Then last, but not least, who supervises the Directors? The Shareholders.

Enthusiasm Injections

One of the reasons salesmen fall down is because they are not supervised closely enough. I do not mean bossed. We do not know the meaning of "Boss" in our organization.

Supervision means for one thing that you get out with the salesmen occasionally, especially the men in the Provincial territory, who are meeting to-day probably the greatest resistance in the history of trade in this country. They are only human, they get lonesome, they have gone a week perhaps without an order. The greatest asset for a salesman to have is a big stout heart, not knowing the meaning of "Quit." Well, that man needs supervision it might be termed, or assistance, a new injection of enthusiasm, which he can only get from an executive higher up.

The Heart Touch

I have recently returned from a trip to the Coast. I am running the manufacturing end as well as the selling end, but there is nothing else so important to my mind as going out and visiting these men, spending a day or two or three with them, getting that heart-to-heart touch that they appreciate so much—I know it because I have been there and received that treatment.

Necessity for Training

As to **Training.** How many firms do not seem to realize its necessity? I have had men come to me who seem to have been given a price list and an order book, and left to grab any further knowledge they could out of the atmosphere. These salesmen are going to run up against other men in parallel lines who have been trained, and we have got to see to it that our men are equipped to meet these trained men. If in your own judgment the new salesman is the right material for your organization, then it is worth spending time and money to give him the proper ammunition.

Peddling Troubles

It is important to train salesmen to know that it is no earthly use telling their troubles to fellow salesmen.

To salesmen I say, if you do not agree with the policy of the house don't go to Bill Jones about it, he cannot cure it; if the sales manager will not cure it, go to the general manager, and if he does not satisfy you, go to the president.

Get your men to have enough confidence in you and the house to now that they can not do that. Many good sales organizations are wrecked by "gossip" breeding disloyalty, so have them feel that if they think they have any complaint they can come to you, and either they will "sell" you that they are right or you will "sell" them that you are right. People are only suspicious of things they do not understand. It is of primary importance in training salesmen that they should know and thoroughly understand the policy of the house. Then it will have their support.

Constructive Help

One of the chief duties of the sales manager is to give his men constructive help in their work. If a sales manager cannot help his salesmen make sales, what is he for? I have three sales managers in my business, one for each division. Each of them when he visits an agency helps the man there to make sales. If he could not he would not be sales manager. I do not mean for him to go out and canvass the stores, I mean he is everlastingly gathering material and thinking, so that he has something to take out with him and say "Put this down in your note book."

A Talk on Cards

I have a little talk on cards for our salesmen. I am a great believer in teaching through the eye. Some of these cards are:—

Success is simple. You can talk five minutes on that to a convention.

Service. Action of one on behalf of another in the interest of both.

Add yourself up. Don't overlook the weak spot—we all have a lot of them.

Think in big figures. Teach the salesman who is selling two thousand to think of ten thousand.

We are only as big as we think. Let him look at that for a minute.

Increase health and knowledge. The salesman can never afford to stop doing that.

Men make the business. You can take the biggest concern in Canada and burn down the whole institution, and they could collect the insurance and build up again, but if you took my seventy-two salesmen I would have some trouble to get things going again. Trained men are of more value than machinery and plant. Let them know how much you value them.

Teach salesmen not to guess, to know what they are talking about.

Cut out gossip, fault-finding and destructive criticism. What is wanted is constructive criticism.

A man is known by the company he keeps, and a company is known by the men it keeps.

The open mind is the growing mind.

Men should not be employed at any task which a machine can perform.

Self Analysis. Teach the salesman to analyze himself, the most helpful thing he can do.

Better to aim at perfection and miss than aim at imperfection and hit it.

Organize the brains of your organization.

Don't make the same mistake twice! But if you never make any mistakes you are no good.

Co-operation.

Concentration. On the work you are doing.

Study, learn and teach.

Think.

Tell your griefs to the man who can help you.

Through The Eye

The purpose of these cards that I use at conventions, and further that I distribute around our factory and office is to educate the organization through the eye, and at conventions you will find the salesmen copying them down in their note book, in other words, they are gathering ammunition that is going to help them at some time.

The sales manager who can select the proper men and train them properly will never have to look for a lucrative position. The position is looking for him.

A Closer Relationship Between Central Station and Contractor Dealer

By C. C. BAINES *

That a closer relationship should exist between the central station and electrical contractors and dealers is a fact which I believe will to-day be granted without discussion. The central station needs the co-operation of the electrical contractor as much as the electrical contractor needs the co-operation of the central station. Both have their place in the world to-day. Both must function with each other to work out problems which present themselves daily.

There has been in the past in a great many localities anything but a spirit of unity between the central station and the electrical contractor. The electrical contractor has been prone to knock the central station rather than boost it. If we will investigate carefully we will find that there is an underlying reason for this condition of affairs, and I will endeavor to point out as many as possible of the grievances which the electrical contractor has against the central station.

Before the Electrical Contractor

Back in the early 90's when electricity was first being made use of for light and power purposes, we find that there existed no electrical contractor. What at that time took the place of the central station did not only the work of electrical construction but also managed the sales of what few electrical appliances then existed. There was no electrical contractor.

As time went on and the central station came into its own there arose the demand for the electrical contractor, and naturally the central station, which had controlled the electrical field prior to the advent of the electrical contractor felt somewhat as though the contractor was an intruder in its field. As the electrical industry was developed the contractor added to his line the sale of electrical appliances, and more and more the central station looked with anything but a co-operative feeling.

First Evils

One of the first breaches that existed between the contractor and the central station was the practice of the central station replacing lamps without cost to its customers. With the advent of the mazda lamp the practice of replacing lamps

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*Before Indiana State Association

free of charge was replaced, in a great many localities throughout the United States, by the practice of selling lamps at less than list price.

This practice was no doubt made in order to control the sale of mazda lamps. Perhaps the central station will say that the public demands this practice. But if the public demands this practice it seems rather strange that the public would purchase millions of lamps per year from the electrical stores and pay the standard list price established by the manufacturer even though it knows that it can purchase lamps at a discount from the central station.

Is it logical to think that the practice of replacing blown fuses is another demand of the public when we find on investigation that thousands of dollars worth of fuses are sold annually from places other than the central station?

Practices Condemned

The practice of repairing appliances, sold by the central station without cost even though the guarantee has expired is another practice which seems to me is to be condemned. Likewise the practice of the central station of selling large motors and installing them at cost is most unfair to the electrical contractor. I have often come in contact with cases where appliances have been sold on terms which have extended over a period of two years or more. Is this fair?

This selling of lamps at less than list; this replacing of blown fuses without cost, and numerous other conditions just mentioned, certainly do not add to the income of the central station nor at the same ime could it offer a co-operative spirit between the central station and the electrical contractor.

In this day when central stations are asking for, and no doubt need, increased rates to cover the enormous advance in overhead expenses, it seems to me a rather ludicrous condition to allow this source of income to escape.

It is folly to believe that the public demands practices of this kind. For we believe that no sensible person would expect a central station or contractor to replace blown fuses or sell lamps at less than list. It is true that the public will accept these privileges if they are offered. But I believe you will agree with me that the public as a whole is not unreasonable in its demands.

Public Unfair

The fact that lamps and appliances are oftentimes sold at less than list brings from the public the statement that the electrical controctor who does not cut the price is holding the prices unfairly. I have heard of appliances being guaranteed by central stations for an indefinite period of time. But I also think that no sane person today expects any kind of appliance to last forever. Of course as long as the public is furnished with service of this kind it would be foolhardy indeed for them to reject it, but I again ask does the public demand it?

It seems to me that the establishment of sub-collection departments in the store of the electragist is an excellent means of getting closer co-operation between the central station and the electragist. This would also afford a much better means of collection as far as the public is concerned and would tend to establish the fact that the central station was endeavoring to render better service at all times.

Could Pay Bills Promptly

The housewife could pay her bills more promptly without a trip to the lighting company's office. Then some month when she did not understand why her electric bill was so high she could feel that by asking her electrical dealer she would get an answer which would be given in her best interest, rather than a stock reply from one of the clerks in the lighting company's office.

We all know how ready the general public is at all times to criticize a public utility and particularly a central station. It therefore seems only logical that the central station should do all in its power to avoid criticism. There is no question that the local electrical trade can exert a very powerful influence on public opinion.

Electrical contractors, dealers, and their employes are in constant contact with the lighting company's customers. Their opinions are therefore consulted quite frequently regarding service trouble, high bills and so forth. The kind of an answer will therefore depend largely upon the attitude of the electrical contractor based upon the treatment which he has had at the hands of the central station.

Valuable Contact

To show the attitude of some central stations toward the electrical contractor permit me to quote the commercial manager of the Ft. Smith Light and Traction Company: "Have you realized that every contractor-dealer in your city is a personal salesman (without pay) for your central station, preaching the gospel of your business, working for your profit; that every electrician he employs can be made a good salesman for you; that their wives and their children, relatives and friends can all be made boosters that will build up your load, stop unfair criticism of the electric lighting company, and put electricity over?"

So in conclusion I desire to say it is my honest conviction that the central station will find the electrical contractor ready to meet it more than half way in working out a policy of better co-operation. The electrical contractor does not expect the unreasonable, as has been demonstrated in numerous cases in the immediate past where central station and electrical contractor have come together and worked out their individual problems as one.

Ever ready to boost one another with increasing confidence in each other, ready to co-operate to the limit, and always willing to serve each other, is the spirit which should exist between the central station and the electrical contractor.

Trade Publications

The Mines Branch of the Department of Mines, Ottawa, has issued a booklet, No. 567, entitled "The production of coal and coke in Canada during the calendar year, 1920."

Marine equipment is the subject of Circular Reprint 106, issued recently by the Westinghouse company. The publication shows the diversity of marine products manufactured by this company through the reprint in the circular of advertisements that have recently appeared in leading marine journals.

Westinghouse turbine generator units are described and illustrated in Circular 1094-B, just issued by the Westinghouse company. This publication contains a discussion of the reactance and impulse types of turbines, both the semi-double flow type and the multiple cylinder type. Bleeder turbines and geared turbines are described, and each part of the turbine is elaborately treated. The generator is also discussed in detail, and illustrations are given to show the latest types of construction.

The Delta-Star Electric Co., Chicago, Ill., have issued a sixty-four page bulletin No. 37, devoted to outdoor substations of all voltages up to and including 66,000 volts. This bulletin contains substation equipment assemblies and is replete with illustrations of substations in commercial service. A copy will be sent upon request.

A. M. S. Engineers Opinion of the Queenston Plant

An impartial viewpoint is always valuable on any question, and for that reason we publish aletter written by Mr. F. L. Stuart, a very well known United States engineer, to Sir Adam Beck, on the occasion of the official opening of the Chippawa canal scheme at Queenston on December 28. The letter was evidently written from entirely kindly and disinterested motives by a man who believed the statements he made were true. Mr. Stuart is vice-president of the American Society of Civil Engineers, and among other activities is consulting engineer to the Hudson River Bridge Corporation in charge of all foundation work and terminal facilities, involving an estimated expenditure of some half million dollars.

December 28th, 1921.

Sir Adam Beck,
Chairman, Hydro-Electric Power Commission.
My Dear Sir Adam:

You are to-day formally opening an undertaking which is of epoch making importance and far-reaching in potentialities for the material progress of Canada as well as of the Niagara District of Ontario.

The vision, will and ability of the Commission and the people of the Niagara District to develop their natural resources in such an efficient degree will be appreciated more and more as the years go by.

The conception is simple—the water is taken by an open canal from a point at the head of the rapids above the Niagara Falls and delivered to a power house at the foot of the rapids below the whirlpool—thereby getting all of the energy possible from each cubic foot of water used in its passage from Lake Erie to Lake Ontario.

The magnitude and importance of the work in carrying out such a conception is one of the accomplished feats of our generation. It is the largest single hydro-electric development in the world and is the largest publicly owned undertaking of its kind ever attempted, and is a path-finder in such a field.

Its importance is not yet fully understood. By the magnitude of the cheap power produced and by the example of its usefulness it will directly and indirectly give an impulse to the upbuilding of the entire country, which will be second in importance only to the effects which the railroads have had on the country's growth. The difficulties of construction were many and at times seemingly unsurmountable—each foot of canal represented effort, each mile great difficulties overcome and each section of the work an established precedent in construction.

The personnel who carried out the work were faithful, hard-working, able engineers and superintendents of construction, meeting their problems daily with a resourcefulness, courage, and earnest effort which deserves your admiration. Their names Gaby, Acres, Angell, Goodwin, Brandon, Hogg, Hull, Hearn, Millar, Blanchard, Scriven, LeRoy, Anderson, Reid, Nablo and many others—when the list is published you should remember them as men who carry on and carry on well.

It should be a matter of congratulation and of gratitude to the directing force of and on the work that this large project has been carried through in such a workmanlike way with honest and able men, without discord, disaster, or scandal and now, without fuss or feathers, stands out as an accomplished fact, a splendidly effective addition to your resources which all Canada can be proud of.

Sincerely yours
(Sgd) Francis Lee Stuart

Miscellaneous

The Western Electric Company announce that they have opened up a wholesale electrical supply house at 216 Bannatyne Avenue, Winnipeg.

The N. Slater Company, Ltd., Hamilton, Ont., have for distribution a comprehensive Hubbard catalogue, which is a complete list of Hubbard pole line hardware and Peirce construction specialties.

The contract has been awarded for the wiring and lighting of the new Paris arena to Mr. Percy Creen. Mr. Creen has just launched out as an electrical contractor and we wish him every success. The lighting will include 32 200-watt lamps in the main part of the building; 12 200-watt lamps over the curling rink and a number of 100-watt lamps in the dressing rooms. The circuits will all be controlled from the office at the main entrance.

Messrs. R. B. Turner and W. A. Johnson, under the name of Johnson-Turner Electric Repair & Engineering Company, have just established themselves at 24 Assumption St., Walkerville, Ont., where they will carry on an electrical business, including all kinds of repair work. Mr. Turner who is manager and electrical engineer, has had seven years' experience with the Westinghouse Electric & Manufacturing Company at East Pittsburgh. The firm will thus engage in both engineering practice and repair work.

Radio Ramblings

"The melancholy days have come
The saddest of the year"
So sang our friend the poet once
But now he's wrong I fear.
The summer statics over and
The air is clear and bright
There's always something doing tho'
I listen every night.
On Saturdays a football game
Will find me full of pep
Tho' far away from scenes of strife
It seems but just a step.
When winter comes and piles of snow
Are heaped about my door
On Sunday morn why freeze my toes?
I'll venture out no more.
For in my humble cottage is
A simple wireless set
I'll hear the choir singing and
Perhaps a sermonette.
It has one great advantage if
The sermon fails to suit
I'll cut the preacher off real short
And practice on my flute.
Now after all is said and done
There's just this much about it
Take my advice and get a set
No home's complete without it.

—Peter Deets.

The Development of Wireless—II

A Series of Short Interesting Articles Covering Wireless Progress to Date

By F. K. DALTON

It was about the year 1864 that Clark Maxwell became convinced of the existence of the electromagnetic waves which are now used in wireless communication. He had completed some extensive calculations in which he discovered that the electrical energy entering a wire was greater than that which could be drawn out of it. This refers to a wire such as an aerial where the circuit is not complete, the wire being unattached electrically at the distant end. He then conceived the possibility of radiated energy but was not able to prove his theory for at that time there was not any known means of producing or detecting such waves. He claimed that the proportion of energy radiated increased with the frequency at which the direction of flow of current was reversed. He was satisfied that the radiated energy went out in the form of waves which had the same frequency as the current in the aerial but he did not know even how to produce these high frequency currents.

His theories were freely discussed in scientific circles and a few years later Prof. Fitzgerald suggested that possibly the electric spark might be a means of obtaining high frequency currents but he did not offer any suggestions as to a suitable detector.

In 1888, Prof. Hertz performed the first really satisfactory experiments in which he produced the waves by means of an electric spark and detected their presence by means of a ring in which there was a very short gap. The existence of waves was indicated by minute sparks appearing at the gap.

Having now proved that these waves did exist and thus confirming Maxwell's theory, he proceeded to study their laws. He found that they followed many of the laws of light but noted the remarkable peculiarity that they penetrated many substances which are opaque to light, and he advanced some further theories as to the nature of the radiations.

A year after Hertz had made his famous discovery, Prof. Elihu Thomson suggested that, with suitable apparatus, these waves might be used as a means of rapid communicaton. The distances across which Hertz could detect the waves were very short, only a few feet, and the next steps taken had the effect of increasing the distance considerably.

In 1894 Sir Oliver Lodge discovered that, in the presence of these waves, a group of metal filings would cohere and become conductive, allowing sufficient current to pass through to operate a telegraph relay. The chief drawback in this method of detection was that the filings would not fall apart and resume their original state when the waves ceased to come. The result of these discoveries was the invention by Lodge of a detecting device known as a "coherer," consisting of a small pile of filings between the ends of solid metal bars, the whole being enclosed in a glass tube, and a tapper, known as a "decoherer," was operated by the relay so that the filings were continually shaken while the waves existed but as soon as the wave ceased the next tap shook the filings apart, the relay then opened and remained in this position until the arrival of the next group of waves.

The relay could be arranged to operate a sounder or other device from which the signals could be read or the noise of the decoherer would suffice.

By means of this detector a distance of one half mile was immediately obtained and by gradual improvement and refinement in design it soon became possible to increase the range to several miles.

The first step in improvement was the placing of the elements of the coherer in a vacuum. This prevented oxidation of the small metal particles and made them more definite in action.

Up to this time wireless waves were only of interest to experimenters and physicists. Marconi now commenced to build and test out devices based on the then-known laws having in view a commercial application of the waves to communication. He made use of the appliances already developed by others, used vertical antennae for both sending and receiving and wireless communication became a fact.

Messages were sent in code with a spark transmitter and coherer detector. Owing to the time required for the relay and decoherer to complete their cycle of events, it was impossible to attain any appreciable speed.

This coherer simply indicated the presence of the waves but gave no character to the signals. The magnetic detector now made its appearance. In this device a band of soft iron was kept in continual motion through two concentric coils. The wireless signals, coming through one coil, had the power to magnetize the iron and this change in flux density caused currents in the other coil which was connected to a pair of telephone receivers. The signals were thus made audible, the stronger waves produced the louder sound and certain character in the received signals was noticeable. A decohering device was unnecessary, the receiver being always ready for the next wave. The moving iron band was kept in slow motion by a quiet clock mechanism which had to be wound once an hour. These detectors were found to be very reliable and in fact to-day are standard equipment for emergency on most of the ocean going vessels.

This magnetic detector was soon replaced by the much simpler, cheaper and still quite commonly used crystal detector consisting of a metal point resting lightly on certain crystals such as silicon, molybdenum, carborundum, galena, etc., which by virtue of their power to rectify an alternating current of small magnitude can so alter the incoming waves that a distorted wave of current is sent through the telephone receivers (hereafter to be called "phones") and sound waves are emitted by the diaphragms.

There is no mechanism connected with this detector, it derives the power it gives to the phones from the part of the radiated wave which it receives, and its only drawback is the fact that the whole surface of the crystal is not sensitive and good spots must be found in order to obtain fairly loud signals. The waves emitted from the sending equipment in the station where a crystal is installed, very frequently knock the metal contact off the sensitive spot which has been found and it becomes necessary to readjust the detector. The time lost in readjusting often results in the missing of part of the signals which are wanted, but this fault has not prevented the crystal from being used extensively by commercial and amateur stations throughout the world. The fact that there are no parts to wear out and no batteries to run down, make it very desirable for isolated land or ship stations.

Giving quantitative response, i. e., the intensity of sound varying with the strength of the waves received, it may be used for receiving wireless telephone stations as well as spark stations.

Probably the next step of importance was that of tuning both sending and receiving stations. Selection of desired stations without interference from those not wanted, and considerable increase in distances with given sending and receiving equipment were both obtained by tuning.

The fact that an electrical circuit is resonant at a certain frequency depending upon its electrical constants—capacity, inductance and resistance—is the fundamental principle in tuning, and by variation of one or both of the two former quantities, a range in resonant frequency is obtained.

BETTER MERCHANDISING

Selling the "Idea"

The cities of Hamilton and Toronto are in the midst of an educational campaign to create in the home lovers of those cities the attitude of mind that says "I need electricity in my home."

Let us not lose sight of this basic idea. These campaigns are not interested in selling appliances or wiring—directly. They have only one object—to "create a desire." That desire is—to do things in the most modern, convenient, expeditious, sanitary, labor-saving way the world knows about today.

It is highly desirable, looking to the success of these campaigns, that indivdual interest should be kept as much in the background as possible. We must try our best not to confuse the mind of the man and woman we hope to reach. Above all we must try to keep him from thinking that back of it all, our chief aim is to sell him an appliance.

The publicity campaigns have been carefully thought out. The announcements are being so worded that the advantages of electricity are placed before the readers in a logical, readable, convincing manner. In the home itself no attempt will be made to sell anything but the value of electricity.

It will be patent to everybody that the ultimate result of such a campaign must mean an increased demand for electrical equipment of every sort. Let us in the meantime, however, keep our commercial desires in the back ground. Let us strain every nerve to sow the seed in the public mind that the best way and the only way to keep house is through the utilization of this great and wonderful power that Providence has supplied to us at Niagara Falls—the heritage of the people of the province.

Hamilton's Electrical Campaign is Gaining Momentum

The Essay Contest, Succesfully Applied to the Different Appliances, Arousing Wide Interest Among Householders

The Hamilton electrical campaign is going along persistently and effectively. Electric pages are appearing regularly and the essay contests, particularly, are arousing very keen interest in the homes. One by one the people of Hamilton are being led to investigate and analyze the merits of electrical appliances. An example was the essay contest on portable lamps. It is surprising how eagerly the young people can pick out strong points in these appliances and how eagerly they enter into the contests. It can easily be realized, too, how interested parents become in their essays and how valuable a form of advertising the Hamilton Electrical League has set in motion. The Hamilton Electrical League finds, also, that the interest increases with the various contests, i. e., the effect is cumulative. Samples of the essays are exceedingly interesting and are reproduced herewith:

Essay on "Portable Electric Lamps"

"New lamps for old, new lamps for old!" was the cry of long ago, and no less is it the cry of the 20th century.

Who that remembers the drudgery of the daily "lamp cleaning" doesn't rejoice in the present day satisfaction of having no lamps to clean?

Just a turn of the switch, the light is there; no matches, no oil, no smell!

And what a variety of portable electric lamps there are!

The "standard" lamp for the parlor, so easily switched off when daughter's beau is calling, and on when father comes in.

The sewing lamp for mother, close to her work table or sewing machine.

A reading lamp for father by the side of his favorite arm chair.

If baby wakes at night, there is the lamp that clips on the side of the bed post, just where mother can reach it in a moment. Then the nervous old maid is catered for and she can hunt possible burglars by the aid of the "electric torch," and many a district nurse has been glad of the same friend when going her rounds in dark alleys and stairways.

So what more acceptable gift at Christmas time than a portable electric lamp?

There are all kinds and all prices to suit all uses and all purses, and each will prove a real friend to its owner.

MRS. A. G. KEILLER,
Box 507,
Burlington, Ont.

A Portable Lamp—A Ditto Ditty

Ho, people of Hamilton, ye who read
Here's news for you which you must heed.
A Portable Electric Lamp you need
For every room, as you must concede.
When through this list you all proceed,
You'll feel you must have one indeed.
You'll need it when you're a chaperone,
You'll need it when you're all alone.
You'll need it for the gramophone,
You'll need it at the telephone.
You'll need it at your office desk.
You'll need it when you when you take a rest,
You'll need it when you have a guest.
You'll need it when burglars molest,
You'll need it in the parlor,
You'll need it in the hall,
You'll need in the springtime,
You'll need it in the fall,
You'll need it when you're reading,
You'll need it when you write.
You'll need it when you're working,
'Twill save your good eyesight.
You'll need it when you're mending,
You'll need it when you paint.
Buy your wife one for a gift,
She'll think you are a saint.
You'll need it for your parties,
It's fine for just two.
You'll need it when you're happy,
You'll need it when you're blue,
You'll need it when there's sickness,
You'll need it when there's health,
You'll need it in poverty,
You'll need it in wealth,
You'll need it when you're dining,
You'll need it when you lunch,
If you don't buy a couple
You surely are a dunce
So if you be a Gentile or if you be a Jew'
The price of a Portable Lamp you'll surely never rue.

HELEN PUGSLEY
Aldershot, Ont.
P. O. Box 63,

The Portable Electric Lamp

My mother and I went shopping. We didn't know what to get daddy for Christmas. We always buy his present first. Mother suggested books, because daddy loves to read, but I reminded her that his eyes bothered him when he read at night. That gave mother an idea.

"I know," she said, "a portable reading lamp is what he needs. It will shade his eyes and throw the light on his book. He can read where he likes—in his chair or on the chesterfield if he is tired—and always have the lamp in proper position to take care of his eyes. Come, dear, we'll go to an electrical store."

Such an abundance of pretty library lamps were displayed! Mother selected one with an adjustable green shade. Green is the most restful color for the eyes.

While waiting for change, mother and I looked at boudoir lamps. There was one to suit every bedroom I could think of. One with a chintz shade looked as though it ought to belong to my sister's room. Mother agreed with me and thought the lamp would add much to the appearance of the room, and also be very useful, as it could be carried from the dresser to the secretary as needed. "You may send this lamp, too," said mother to the clerk.

"Let me show you the floor lamps, or piano lamps, madame," said the clerk. "They are not a mere luxury in the home, but a necessity, if you want your home to have an attractive appearance with practical and useful furnishings. The floor lamp can be placed anywhere, for we all like a change in the arrangement of a room, and it is not only beautiful in itself, but the soft warm glow it reflects on the other furnishings just doubles the value of your efforts to make things look well."

Mother shook her head, although she looked longingly at one with a rose shade. But when I got home, I whispered to daddy about that lamp with the rose shade and I do believe mother will get it after all.

EDITH DARLING,
21 Stanley Avenue.

The Comfort of Electric Lamps from Experience

It is a big pleasure for me to be able to let someone know outside of our house what extraordinary comfort can be gotten from a portable electric lamp. In our case it is a desk lamp.

On the anniversary of our moving into our new house, father bought a desk lamp for the library table. It is so convenient when studying lessons, writing letters, or, as father says, "When learning the daily news." The shade can be adjusted so that the light falls directly on the book, paper or whatever one is using, without hurting the eyes.

We are expecting some day to have a floor lamp, or at least a piano lamp; but now, while we have not either of these, sometimes when I am left alone to amuse myself, I take the desk lamp into the parlor and put it on a pedestal beside me at the piano, or on the top, adjusting the shade so that the light is shown on the music. In such conditions I could stay alone, I would not mind how long.

O boys! Who would be without an electric lamp? Not us, that is sure.

The new house which mother chose
For our new domicile,
Would be dark without that desk lamp,
Which gave us all the style.

MILDRED ELLIS,
37 East 25th Street,
Mount Hamilton.

Annual Meeting of Hamilton District Electrical Association

A meeting of the Hamilton District Electrical Association was held in the Royal Connaught Hotel, January 4, 1922, at 8 p.m. The following officers for the year 1922 were elected: Fred Thornton, contractor-dealer, 310 Ottawa St. N.; W. G. Jack of Jack Bros. Electrical Construction Co. 224 Main St. E..; V. K. Stalford, consulting electrical engineer, Sun Life Bldg. W. G. Jack was elected to represent the District in the Provincial Executive Committee.

An invitation was extended by the Canadian Westinghouse Co., Hamilton, to the members of the Hamilton District Electrical Association to visit their new lamp works. The members of the Association accepted this invitation and will visit the factory on Tuesday afternoon, January 24th. A very pleasant and beneficial trip to this plant is anticipated by a large number interested in the electrical industry in Hamilton. This is the first of a series of visits to be paid to various factories in Hamilton by the members.

At the next meeting of the Hamilton District Electrical Association, which will be held February 1, 1922, dinner will be served and the speaker of the evening will be Mr. E. H. Porte, general manager Renfrew Electric Products Co., Renfrew, Ont. Members of the Association are anticipating a very pleasant and instructive evening.

At a meeting of the Executive of the association held January 10th, Mr. Fred Thornton, contractor-dealer, was elected chairman of this committee and K. J. Donoghue of the Northern Electric Company was re-elected secretary-treasurer for the ensuing year.

Chatham Radio Club Activities

The Chatham Radio Club which was formed in September, 1921, now boasts a total membership of sixteen members, eight of whom are licensed amateurs. Mr. Ivan Collins is president of the Club; Mr. Edward Davey, vice-president; Mr. C. Gammage, secretary-treasurer; Mr. A. Edwards, radio electrician; Mr. Harold Jackson, traffic manager. Equipment recently installed by the Club includes a one-half kw. spark transmitter and receiver and two-step amplifier. The meetings are held in the Chatham Industrial School. Both Senior and Junior classes are held.

Electricity Wins First at Masquerade Ball

Harold A. Munnion of the Gate City Co., Ltd., Winnipeg, believes in boosting the electrical industry. On New Year's eve he attended a masquerade ball held in the Board of Trade building, attired to represent "Electricity." The head piece showed a model power house, transmission line, and street lighting lamps, which were illuminated at short intervals. The costume was a white duck suit with various electrical advertisements and slogans. Attached to the left shoulder was an old fashioned candle stick showing a lighted candle, representing 1821, and on the right shoulder a miniature floor lamp of the 1922 period, which flashed on and off periodically, the effect illustrating 100 years of progress. On the back of the coat was a card with the slogan "Say it Electrically, Flowers Die." Mr. Munnion was awarded first prize—a very fine electric reading lamp—for the best and most original costume exhibited, and was thoroughly deserving of it. Mrs. Munnion, who accompanied her husband, received the first prize for the ladies' most original costume. Dressed in black velvet she represented a very attractive pussy cat.

Leaves Winnipeg for Toronto

Fred J. Kennedy, who for the past twelve years has been associated with Marshall Wells Co., Ltd., Winnipeg, in the capacity of manager of the electrical and builders hardware departments has resigned. Mr. Kennedy left Winnipeg on the 16th January for Toronto, to accept the position of sales manager with the Kennedy Hardware Co., Toronto, which business is controlled by his uncle. The electrical fraternity of Winnipeg will miss Mr. Kennedy, as he was a popular member and an energetic worker in the Manitoba Electrical Association.

"Electrical Salesman's Handbook" Ready

Announcement is made by the "Electrical Salesman's Handbook" committee of the Commercial National Section of the N. E. L. A. that the first two units of the new handbook are ready. These sections are those entitled "Industrial Lighting" and "Lamp Equipment for Commercial and Industrial Lighting." They are punched to fit the old handbook covers and may be had from the committee at 50 cents each. As soon as practicable the remaining sections of the handbook will be revised and issued in the new form.

Past, Present and Future of Merchandising Electrical Goods

How Can We Create Electrical Merchants? How Can We Sell More Goods, Give Better Service and Make a Sure Profit?

By GEORGE C GRAHAM

How can we, in the shortest possible time, create electrical merchants—men who understand the basic principles of retailing; know how to sell at a profit and when they are selling at a profit; know how to reach the public; to get them into their stores; to give them service when they get them. This is one of the problems of the electrical industry.

Mr. Graham read an interesting paper, full of useful hints, before the Rhode Island Electrical League, which is reported in the "National Electragist." He urged the necessity, not only of rendering service but of rendering it at a profit. Comparing the past with the present, in 1911 only 20,000 washing machines were manufactured while in 1921 1,026,000 were manufactured. Yet the industry is still in its infancy. There are 8,610,000 wired homes and less than half of them have vacuum cleaners and the number of wired homes is constantly increasing. The field cannot be saturated.

Appliance Business Second

There is a great big future in the appliance business. Roger Babson, the statistician, has said that it is the second big best business. It may be larger in a few years than the automobile business. The stage is set. The people want the appliances. The manufacturers have them for sale. The dealer must render the service of selling them at a profit.

To make a profit and to render service at the same time it is necesary to do four things:

1. Sell the best.
2. Maintain uniform price and policy.
3. Close sale as quickly as possible.
4. Maintain an efficient service department and know when to charge for service.

There are 137 washing machine manufacturers. They are not all sound. It is better for the dealer to sell only the well advertised standard appliances, those made by well known manufacturers who can be relied upon. It is bad for a dealer to begin selling a machine that will disappear from the market in a few years and for which when parts are needed it is hard if not impossible to get them.

Often a dealer is misled by discounts. The discounts may not be enough to make up for the increased cost of selling the machine. It certainly will not make up for the bad impression caused by carrying goods that are not standards and which cannot be replaced.

Specialize But Don't Cut Prices

Specializing will increase sales and profits. It makes the rendering of service easier and makes it possible to give the service promptly when it is wanted.

Cutting prices means giving away the profits. There is not a large enough margin on any electrical appliance so that prices can be cut without giving away the profits. At the same time customers don't think much of a man who cuts down his price. Such practice may work all right in other countries but ours is a country of uniform prices and if the dealer is to make a good impression he must stick to the price that he has made.

Money is lost when the sale is not closed promptly. Don't leave a machine out too long before closing the sale. [illegible] and this is reduced if machines are left out too long. A few days or a couple of weeks should be long enough for a person to learn whether or not he wants the appliance.

Service is a big item. We have found that service calls cost us on an average of about five dollars a call. By selling the best appliances you cut down the need of service. We used to give one year of free service. We have now cut it down to 60 days and have also found that many service calls can be handled in such a way over the telephone that it was not necessary to send out a man.

Education Big Factor

It is largely a matter of educating the public. Before we cut down our free service, we gave the matter very careful attention. We feared that it would react, but it has not. The public is willing to pay for what it gets. It would rather have good service at a fair price than poor service free.

Appliances like refrigerating machines and washing machines fall into a different class from other appliances. These are new and require more free service. People have to be taught.

In selling we specialize. One set of salesmen sell washing machines and ironing machines. Some of them take the machines right along with them on a Ford truck and demonstrate as they go. Some of them are exceptionally successful in making sales in this way, a large proportion being closed on the first call.

The cleaners are handled by crews of five or six men working under a crew leader and all working on a commission basis, the leader getting a commission on all the cleaners sold by members of his crew. These men become very expert in their work and the best men close sales on the first call.

In the case of washing machines and cleaners we require 20 per cent of the purchase price for the first payment. In the case of dish washers the money is collected at the time of making the sale. It has been found that a person must use such a machine for two or three weeks before getting accustomed to it and that they are not likely to do this unless they have already paid down the full purchase price.

Windsor District Activities

A regular meeting of the Windsor District Association of Electrical Contractors & Dealers was held on December 30, 1921, at the Barton-Netting Company's offices. The president, Mr. V. B. Dickeson, occupied the chair. There were also present Messrs. Roach, Reaume, Garfat, McKeller, Phelan and Cook. Mr. Dickeson read a paper on the subject of manufacturers fixing retail prices, which was followed by a useful discussion. Mr. Dickeson's paper will appear in the next issue of the Electrical News, as it represents a viewpoint that may very profitably be placed before the trade and discussed at greater length.

The January 13 meeting will be addressed by Mr. O. M. Perry, manager of the Hydro System in Windsor. The meeting will be held in the same place, at 7.30 p.m. Mr. A. H. Cook is secretary of the Windsor District Association.

Selling Six Floors of Merchandise in Two Storey Building*

"The chief reason why my store has been so successful in a merchandising way is that I sell six floors of merchandise in a two storey building," a small town merchant well known for his progressive merchandising methods told me the other day.

In other words, the merchant gets as many sales out of one square foot of space as some other dealer, less enterprising and less scientific in his merchandising methods, gets out of three square feet of space.

In these days of space economy space counts for a great deal. Eliminating the important item of rental, the merchant who can get more sales out of his store space shows himself a real up-to-date merchant.

Did you ever make it your business to try and find out what portion of your store space is the best selling space? Do you know what goods can most appropriately be displayed in a certain portion of the store?

I am not proposing an entirely new idea in merchandising. The sales per square foot idea has already been extensively used by most of the department stores in the country. With the department stores merchandising has been reduced to an exact science, and there is no earthly reason why the lead should not be followed by the specialty dealer.

Floor Space Worth

Go to any merchandising man of a large department store. He can lay his finger on any square foot of space in his store and by referring to his card index and chart can tell exactly how much each unit of store space is worth to the store owners in dollars and cents. He can refer to two units of space in different parts of the store and he can tell exactly how these compare in point of selling efficiency.

What purpose do these figures serve the merchandising manager?

First of all, the merchandising manager knows exactly what part of the store is most valuable in sales returns. He wants to conduct a special sale, and he desires to display his goods where they will have the greatest attraction to the shoppers, He knows by referring to his records just what store space will serve the desired purpose.

He knows that a certain article will sell better on the second floor of the building than if it were displayed on the first floor, for he may have found by experience and due investigation that the second floor always attracts a better class of customers.

Other Important Factors

There are numerous other factors involved, and the one I am going to mention is a very important one. Several years ago the directors of a certain department store found themselves pressed for space. As no additional space could be obtained the store directors decided that the only solution was to increase the sales per square foot of the store.

They took a rule and measured off the selling space in every department of the store. After totalling the number of square feet they took a total of the rent paid for the entire building. They then allotted percentages for each department of the store, based on the proportionate number of square feet in each department.

A conference of department heads was called, and this was the proposition put up to them: "We are pressed for space. The store is already small for the enormous business we are doing annually. In order to make the most of the situation we must increase our sales for each square foot of ground. We must make the most out of every square foot of ground. Therefore we are going to rent out a certain number of square feet of space to each department head. The store auditor will credit you with monthly rents on these space allotments."

All Items Considered

Not only is the proportion of store rent credited to the department head, but the latter must also share in the store's expenditures. The store auditor credits each department head with so much for rent, so much for light and heat, so much for salaries of salespeople employed in the department, so much for depreciation of merchandise—and even advertising and delivery are apportioned among the various department heads.

The store directors get together at regular intervals and reapportion these items in accordance with new conditions. They go over the statistics of sales and profits in each department. They can tell whether the sales have increased and whether the overhead is eating into the profits.

If any of the actual expenditures in the department exceed the expenditures alloted by the store auditor the department head is credited with the difference, and he must watch his step thereafter to make up for the difference. This system has created a condition where there is continual competition among the department heads for best showing.

The net result has been a decided saving in overhead. Each department head feels his responsibility in the management of the store. Under ordinary conditions he wouldn't worry his head over delivery expenses and rentals.

Quick Checking Easy

The store management has found it profitable in other ways. It is far easier to size up a situation when you have facts about a particular department at your finger tips. If something goes wrong in a certain department the store owners do not have to rummage all over the store to find the cause.

An investigator employed by a large research organization recently stated that it is very difficult to get a customer to buy on any floor above the fourth floor of any department store. At the same time, he stated, it is not always true that the best selling space is on the first floor of the building. He derived his conclusions from a study of sales per square feet records of a number of department and specialty stores.

The owner of a small retailing establishment need not bother getting up elaborate charts and tables of sales. He can keep close watch on the sales of his various articles. He can compare the sales of articles on various counters and sections of the store, and find out whether the respective sales could not be increased by a proper relocation of goods. If there are several floors of selling space, let the merchant compare the sales of the store, and find out why the sales of one floor exceed those of another.

Mr. G. Armstrong, 1217 College St., Toronto, has secured the contract for electrical work on a store and apartment building being erected at 691 St. Clair Ave., Toronto, for Mr. J. Becker of 265 Gladstone Ave., at an estimated cost of $50,000.

The incorporation of the Henderson Electric Company, Ltd., is announced in a recent issue of the Ontario Gazette. The new firm will carry on the business of electrical contractor-dealers, taking over the business formerly carried on under the name of Henderson Electric Company, Toronto. The firm is capitalized at $45,000.

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*By Dr. Norris A Brisco, in "National Electragist"

Heating the Domestic Water Supply the Modern Way—Electrically

The Advantages are Many—The Cost is Not Prohibitive—Discussion of Proper Sized Unit

By J. A. MacDONALD*

At this time the problem of heating by electricity the domestic hot water supply is receiving considerable attention from central station engineers and those actively engaged in electrical merchandizing. It is generally admitted that the most desirable manner of obtaining results satisfactory to all parties concerned expresses itself in an extension of flat rate to low wattage heaters. These may be classed as the 660 and 1000 watt capacity, operating generally at 110 volts. For the former a rate of $1.50, and $3.00 for the latter, per 720 hour month, has been granted by leading central stations. In the past it has been customary to extend this rate for that period of the year known as the summer months, or that period of the year in which the operation of the furnace is unnecessary. This custom has now become prevalent because of the fact that the standard furnace coil has been used extensively during the winter months for heating the domestic supply of water, and until recent years electricity was not as economical for this purpose as coal. However, these conditions have become reversed by the steady advance in the price of coal, as well as a decrease in its efficiency, and on the other hand by a marked decrease in the cost of electrical energy. The following comments pertaining to the comparative costs of heating a thirty gallon domestic boiler by the standard furnace coil, with coal at $16.00 per ton, and heating a similar boiler electrically at a flat rate of $3.00 per kilowatt per 720 hour month, will be of interest to both central station and consumer.

Before considering this matter it is essential to emphasize the fact that no standard data is in existence that can be applied to the cost of heating the domestic boiler with a coil in the furnace. The cause for the absence of this data lies in the fact that important elements bearing on the exact solution are unknown. The more important of these unknown factors can be outlined as follows:—

(1) The number of gallons required per 24 hours, and the temperature at which it is to be delivered to the taps.

(2) The size of the boiler, the average temperature of the room in which installed, and its distance from the furnace.

(3) The exact position of the coil in the furnace, either in contact with or above the fire.

(4) The exposed area of the coil in square feet, and the number of pounds per square foot, of coal per hour, at which the furnace is fired.

(5) Whether or not the boiler is insulated and the class of insulation.

Cost of Water Heating With Coal

Considering the foregoing it is evident that the problem presents serious difficulties adverse to its exact solution. Actual experience has taught us that the standard furnace coil uses a great deal more energy than is usually required and it is not uncommon for those using this method, to be forced to waste large quantities of hot water in order to save their system from breakdown due to excessive pressure. This waste of energy cannot be overcome because in order to secure comfort in the home it is necessary to burn the furnace at a certain rate, independent of the fact that this rate may be a great deal higher than that required to meet hot water demand.

Notwithstanding the fact that valuable data is absent, we can, by methods of comparison, arrive very closely at the cost of the furnace coil method. Therefore the following article will first consider the maximum demand that is likely to be possible, leaving it to the reader to judge the position of his particular case in relation to the demands suggested.

Theoretically, a pound of anthracite coal contains about 14,200 heat units per pound of combustible. Allowing a loss of 10 per cent for ash and non-combustibles, we have about 13,000 heat units to perform work, which would be possible if we could secure a coal burning device of an efficiency approximating 100 per cent. It is certain that such ideal conditions cannot be attained, and therefore it will be better to arrive at the actual heat units on a basis of the work they perform.

Experience and expert design have combined to make the modern high pressure boiler the most efficient fuel burner of the present day. No factor bearing on securing the maximum number of heat units per pound of coal has been neglected. Therefore an examination of standard data pertaining to these boilers, should furnish a basis for arriving at coal efficiency. A boiler horse-power is equivalent to 33,305 heat units per hour and allowing 3 pounds of combustible per horse-power we have 11,102 heat units or an efficiency of 80 per cent. We find that the same application to boilers of ordinary design, works out at 4 pounds per horse power, bringing the heat units down to 8326 or an efficiency of 60 per cent. Applying fuel efficiency to steam generation we find that a pound of coal with a noncombustible content of 16 per cent will evaporate 9 pounds of water. Therefore there would be an evaporation of 11 pounds of water per pound of combustible. The evaporation of 1 pound of water at 212 degrees into steam at the same pressure requires 964 heat units Therefore the evaporation of 11 pounds of water by 1 pound of combustible requires 10,604 heat units or 76 per cent of the theoretical heat in the fuel.

Very Low Efficiency

The foregoing paragraph has been given to show that even with high grade apparatus the efficiency of coal as a fuel is surprisingly low. It is also apparent that the average householder does not burn his furnace at a higher rate of efficiency than the trained attendant operating high efficiency boilers. Therefore it should be fair to the coal to adopt an efficiency of 8000 heat units per pound as the value that the average household furnace operates on. At the present time heating engineers base their calculations on an efficiency of 55 per cent.

It has been demonstrated that the well known range water back will absorb 10,000 heat units hourly, with a bright fire burning, and in contact with the fuel. The position of furnace coils is well above the fire which naturally results in a lower consumption of heat units, and there is not a serious departure from actual facts when a value of 8000 heat units is adopted.

Dealing with an exposed 30 gallon boiler, and considering what can safely be defined as the maximum demand, it is noted that the temperature of water in city mains varies between 45 and 60 degress Fah. according to the location and the time of the year. It is assumed that the water enters the boiler at 60 degrees and is delivered at the taps at 160 degrees. Therefore the coal will have to continually overcome a temperature of 100 degrees, supply all demand and take care of radiation losses. Taking the weight of water at 8.3 pounds per gallon we have 8.3 x 30 x 100 or 25,000 heat units per hour. For a 720 hour month there would be expended 18,000,000 heat units. Dividing this by 8000 we have 2250 pounds of coal, which at $16.00 per ton, represents a cost of $18.00 per month.

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* [illegible] Ltd., Brantford, Ont. before the Hamilton [illegible] Association.

Radiation Losses

Directing our attention to radiation losses we find that steam at 5 pounds pressure will radiate 250 heat units per square foot per hour. It is standard practice to rate hot water radiation at 60 per cent of this amount or 150 heat units per hour. The 30 gallon boiler represents 17.2 square feet of radiation surface, which with piping can be safely taken at 18 sq. ft. Then the radiation losses from a 30 gallon boiler for a 720 hour month would be 18 x 150 x 720 or 1,944,000. At the value adopted this means 243 pounds of coal, at a cost of $1.96, which brings the total cost to $19.96.

The foregoing analysis covers a maximum demand condition, which is not likely to be met with in actual practice, because common sense tells us that we do not use 30 gallons per hour. On the other hand we must not lose sight of the fact that even if we are not using the maximum demand that we have no way of proving that the coil is not furnishing heat units greatly in excess of our hot water requirements. In other words, the same coil may handle 100 or 250 gallon boilers just as well.

Turning our attention to a calculation based on the minimum demand, we assume that if sufficient energy is applied to a 30 gallon boiler, to raise the temperature at the rate of 30 degrees per hour, that it will take care of a reasonable demand. This is not unreasonable when you consider that it will take practically four hours to heat the boiler to 160 degrees, assuming a similar temperature in the main to that used in the coal calculation. The number of heat units required in this case would be 30 x 30 x 8.3 or 7,470 per hour or 5,378,400 heat units in a 720 hour month, dividing this by 8000 we have 672 pounds of coal. Adding radiation losses 915 pounds would be consumed, which would cost $7.32.

Somewhere between $7.32 and $19.96 per month lies the cost of heating the domestic supply of hot water with the furnace coil, with a tendency to the former estimate, and in isolated cases slightly below it, provided that the water is delivered at the temperature on which the calculation is based.

Using Electric Heat

Considering the heating of the 30 gallon domestic boiler electrically, we are fortunate in the fact that we have at our disposal sufficient reliable data to proceed with confidence. We are aware that the supply of energy is constant and that electric heaters are now offered to the public of 100 per cent efficiency. Experience gained from actual installations has conclusively proven that a 1 kw. electric heater, operating continuously, will supply any reasonable demand that can be expected from a 30 gallon boiler. One kw.h. equals 3,412 heat units; therefore in a 720 hour month the number of heat units expended would be 2,456,640, or a saving over the minimum coal calculation of 4,856,760 heat units which were appropriated by the coil and in consequence lost to the home.

It is easily understood that coal cannot at present prices compete with electrical energy at $3.00 per kilowatt per month, and still less at $1.50 per month if a 660 watt heater is used. It is also noted that constant radiation losses amount to $2.00 per month, and that the $3.00 rate is only $1.00 in excess of this amount.

Having disposed of the matter of costs let us compare some of the factors related to the two different methods. We find that the objections to the furnace coil method can be summed up in the following:

(1) The tendency to give to the coil an excess of heat units over that actually required.

(2) The waste in these units, which could otherwise be applied to heating the home.

(3) The inefficiency of coal as a fuel.

(4) The chilling effect on the fire caused by water at a lower temperature passing through the firebox.

(5) The detrimental action of excessive pressure on the system and valves, caused by high temperature when the hot water demand is low and the comfort demand high.

(6) The tendency to form leaks and the detrimental action on the fire by condensation at low water temperatures.

(7) The inconvenience caused by the presence of the coil in the firebox.

Many Advantages

Regarding the application of electrical energy to the heating of water for the domestic supply, the following advantages are apparent:—

(1) The entire absence of fumes, dust, or noise.
(2) Constant supply of energy at a fixed value.
(3) The elimination of all danger from overheating.
(4) The entire absence of piping.
(5) Energy supplied 100 per cent efficient.
(6) Cost of heating a fixed sum.
(7) Higher furnace efficiency for home comfort.
(8) Lower costs of installation and upkeep.
(9) Independence and flexibility of control.

A point frequently in dispute is the temperature that water should be at for different purposes. It has been found advisable to keep the water in the boiler between 120 and 160 degrees, to allow for excess demands and radiation losses in transmission to the taps. The following temperatures have been adopted after considerable investigation:—

Hands, 103 to 113 degrees Fah.; face, 98; bath, 95; luke warm, 86.

The quantity of water heated is usually less than the quantity used, because water at 160 degrees will take up almost an equal quantity of cold water before it can be used with comfort. It is therefore apparent that the boiler is not required to deliver the total number of gallons used.

Wattage for Various Sized Boilers

The question of wattage required for boilers of different capacity, can be judged very fairly by the use of the following data which has been secured from actual experiment. These values are applied to plain, galvanized, uninsulated boilers and piping. For boilers with 2 in. insulation and piping with 1 in. insulation, 50 per cent of the wattage given will be sufficient. It is assumed that the heater will operate continuously, that the water enters the boiler at 60 degrees and leaves it at 160, and that the hot water demand does not exceed 12 gallons per day.

For demands in excess of this amount add 10 additional watts, for each additional gallon used per 24 hours. In cases where the demand appears to be excessive the next larger size should be recommended:—

Table I.

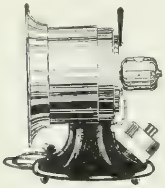
12	gallon	boiler	600	watts
18	"	"	650	"
24	"	"	750	"
30	"	"	850	"
40	"	"	1000	"
60	"	"	1500	"

Newest Developments in Electrical Equipment

Motor Driven Electric Heater

The Carmean Electric Company, [illegible] East Eighteenth St., Kansas City, Mo., has placed on the market an electric motor-driven heater, as illustrated. The object of the device is to provide an arrangement whereby cold air is propelled through and over heat-generating coils by means of a motor-driven air impeller. The mechanism is entirely surrounded by a fool proof metal housing that keeps out the dirt and prevents bodily injury to persons.

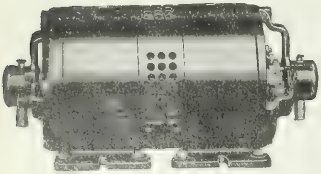
The heater is controlled by a four-way switch, the first turn of which starts an electric fan only, for summer use; the second turn gives low heat of 660 watts; the third turn, cuts in an additional 1,320 watts. The fourth turn cuts off motor and all heating elements. The total weight of the heater is less than 12 lbs. It is claimed by the manufacturer that the important advantage of this type heater is, in the enforced circulation of the heat waves throughout the room almost immediately. Canadian patents on the Carmean Heater were allowed in December, 1921. Manufacturers interested in the Carmean line of heaters should communicate with Mr. Robert Yeomans, of the Department of Industries, 135 Bay Street, Toronto, where one of the heaters can be examined.

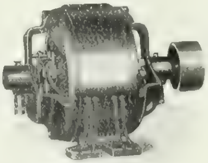

Combined Fan and Heater

High Voltage D. C. Generators for Wireless Telephony

The Robbins & Myers Company, Springfield, Ohio, has developed a new line of high voltage direct current generators and motor-generator sets for service with wireless telephone outfits. The generators are made in 500 and 1000 volt types in capacities of 100, 200 and 500 watts, for use with vacuum tubes and for other special services.

The motor-generator sets are furnished for operation on 110 or 220 volt, 25, 50 and 60 cycle, single phase, alternating current circuits, and on 32, 115 and 230 volt, direct current circuits. They are of compact construction. The 500 volt outfits are the two-bearing, union ring type, while the 1000 volt outfits are the four-bearing, sub-base type. The outfits are carefully balanced, insuring freedom from vibration and quiet operation. The large number of bars in the commutators of the generators does away with the objectionable hum which is present when generators are used which have a smaller number of bars in the commutator.


Motor-Generator Set
[illegible] Type

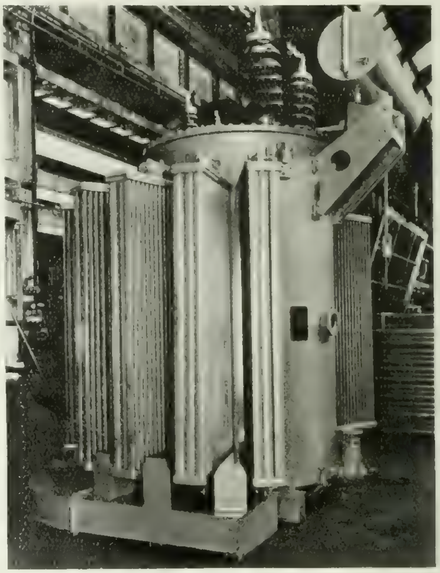

500-1000 Volt Generator
Double Commutator Type

All generators are shunt wound. In the 500-volt types they have a single commutator. The 1000-volt types have a commutator at each end of the generator, so arranged that the windings can be connected in series for 1000 volts or in parallel for 500 volts as desired.

The 500-6 volt and 500-12 volt type generators have two commutators, and other new features, and deliver 500 volts for charging the plate at one end and 6 or 12 volts for heating the filament at the other end, thus eliminating the necessity of providing a battery for heating the filament. The generators equipped with pulleys for belt drive are the same in construction as those used with the motor-generator sets, and the description preceding applies to them also.

New Type Self-Cooled Transformers

On acount of self cooled transformers being designed on an ambient temperature of 40 deg. C., advantage of the full rating of the transformer may not be obtained where temperatures are above this point. Such a case happened in a sub-station of the Southern California Edison Company, so that artificial cooling was necessary. To meet the conditions, air ducts were installed around the base of the 5000 kv.a., Westinghouse single phase, maximum rated, self cooled radiator type transformer, so arranged with openings placed between the radiators to direct the flow of air supplied by a motor driven blower.



With this method of artificial cooling, these maximum rated transformers will carry 25 per cent overload continuously with the same winding temperatures as at full load without artificial circulation of air.

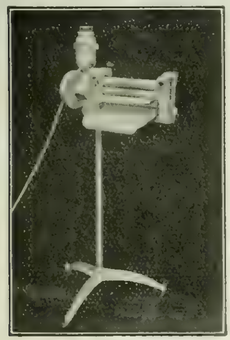
The transformer is provided with a hot spot temperature indicator, an oil expansion tank and a high voltage tap changer, the latter operated by a hand wheel in a convenient position above the transformer cover.

Drying Machine for Hands and Face

The Airdry Corporation, of Groton, N. Y., is manufacturing a machine called "Airdry" for drying hands and face. The machine consists of a white enamelled iron standard, containing a motor, fan, heating element, and an adjustable nozzle for directing the flow of air. Connected with the lighting circuit, the machine is set in operation by means of a foot lever in the base of the standard. Pressing the lever downward causes warm air to be discharged through the nozzle. Releasing the lever stops the motor and the flow of air. This machine is adjustable to any position. It is said to dry thoroughly. It is safe and sanitary and eliminates towels. It is paricularly adaptable to public washrooms, factories, etc.

A Portable Wringer

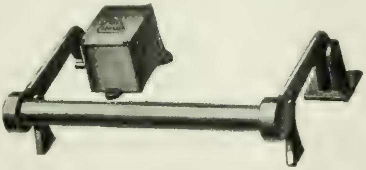
Another labor-saving device under the trade name "Wring-O" is being placed on the market by the Petroleum Engine and Manufacturing Co., 120 Broadway, New York. This is an electrical wringer of the portable type, as shown. It is designed to be used as an auxiliary to the electric washing machine or perhaps as a step toward the use of an electric washing machine by those who feel they are not able at the moment to bear the full expense. It is claimed, also, that an efficient washing may be accomplished by thoroughly soaking the clothes in soapy water an then wringing and rinsing through several waters until clear water is wrung from them. It would seem to be specially useful in apartments and under similiar conditions.



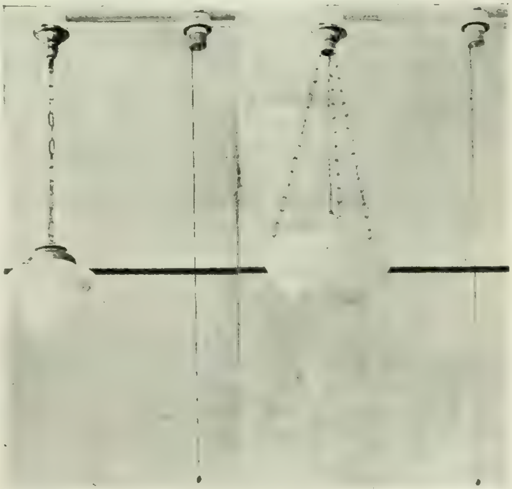
A portable wringer—a useful auxiliary in the laundry

Bank Hold-up Alarm System

For the protection of banks and other financial institutions against "hold-ups", a newly devised system has been brought out by Edwards & Company. The operation of the system is very simple. Tellers' foot switches, as shown in the illustration, are placed on the floor at tellers' windows and other places. Alarm bells or sirens are placed either inside or outside of the premises. The contact-maker can be located where most convenient. In case of a hold-up, the bar is raised by the toe. This operates the contact-maker which immediately causes all bells or sirens to ring continuously until system is reset which can only be done by unlocking door of contact-maker and pressing button marked "Reset." It is important to note that releasing foot switch does not stop the alarm. G. L. MacGillivray & Company Ltd. of 35 St. Nicholas Street, Montreal, are the Eastern Canadian representatives for Edwards & Company.



The town of Sturgeon Falls, Ont., has bought out the property and franchise rights of the Northern Ontario Light & Power Company, within the town limits, and will operate it in future as a municipal enterprise under the supervision of Mr. L. E. Carter, town engineer.



Two types of lighting unit used in the Imperial Office Building, Hamilton, described in our last issue

Electric Railways

Trolley Buses to Operate in Toronto on Mount Pleasant Road

A careful study of transportation problem convinces those who are familiar with all of its phases, that the bus will not take the place of vehicles operated on rails, but that there is a distinct field outside of that of the traction lines which the bus can fill advantageously.

A certain section of this outside field, where service is infrequent, can best be filled by the gasoline propelled bus. Another section, where service is more frequent, and is more closely allied to the traction lines, can be filled more advantageously by the electrically propelled vehicle or trolley bus, as it is called.

The St. Louis Car Company, recognizing the above facts, has recently completed a trolley bus which presents a number of attractive features. The bus was built for exhibition in connection with the proposed installation of trolley buses in Detroit. The electrical equipment was supplied by the Westinghouse Electric & Mfg. Company.

An important feature of the construction, is that the body is built directly on the chassis frame, thus avoiding the duplication of frame members, which occurs when a separate body frame is employed, and giving a very light and strong construction.

The wheel base is 194 inches, and the overall length of the bus is 26 feet. Nine cross and two longitudinal seats are provided, giving a seating capacity of twenty nine. The seats are deeply upholstered and provided with easy springs, which add greatly to the comfort of the passengers.

The driver is located at the front on the left hand side, and the entrance and exit door is directly at his right. From the driver's position, a clear unobstructed view ahead is obtained through a single window of the "clear vision" windshield type, which extends across the entire front of the bus.

Foot operated band brakes are provided on all four wheels, and a separate pair of hand operated emergency band brakes are supplied on the rear wheels. The total weight of the bus equipped is approximately 10,500 lb.

Two Westinghouse type 506-AN-2, 25 h.p. ball bearing motors are used. The motors are mounted beneath the body and are connected in tandem with a short shaft and "splicer" universal joints. The connection is made from the rear motor through a propeller shaft and universal joint to a "Wisconsin" worm drive axle having a gear ratio of 6.5 to 1.

The control apparatus is mounted underneath the hood. This location of the apparatus is ideal in many ways as it provides for easy inspection, places the apparatus in a position where it is well above the mire of the road, simplifies the wiring, and adds a very appreciable factor of safety, as it places the current handling apparatus in a steel compartment entirely outside of, and not under the bus body.

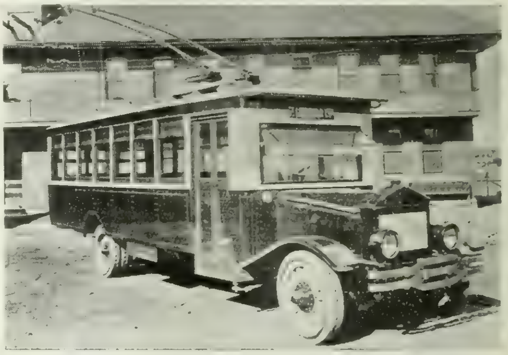
The control is of the series parallel type. Eight magnetically operated switches give the necessary combinations for four steps and three in parallel. The control is operated by means of a foot pedal which is pivoted at a point under the center of the foot, so that the foot rests comfortably at all times on the pedal and a slight rocking motion forward and backward controls the various steps.

There are three operating positions to the foot pedal, which are indicated by "feel" to the operator by a star wheel provided on the foot operated controller. When the foot pedal is placed in the first position, the motors are connected in series and the total external resistance is thrown in circuit. When moved to the second position, the magnetic switches close automatically in proper sequence until all resistance is cut out and the motors are in "full series".

On the third position, the automatic step by step motion takes place up to the "full on" or "parallel" position. The pedal is returned to the "off" position by means of a spring. Both sides of the trolley circuit are opened in the "off" position, thus reducing the chance of leakage to the bus body to a minimum.

The automatic progressive action of the control is so arranged that it is slowed down as the load on the main motors is increased, but under no conditions is it entirely stopped, so the difficulty of "stalling" which may occur in other automatic types under heavy load, is obviated.

Reversing is accomplished by means of a simple knife switch type of reverser which is mounted on the front of the dash, under the hood, with its handle projecting through the dash in a convenient position near the operator.



The St. Louis type of Trolley Bus

An overload trip opens all of the magnetic switches in case of excessive loads. The overload trip is mounted on the dash, under the hood and can be tripped or reset by the operator by means of buttons located on the dash, within his reach.

Two separate overhead collectors are provided which are similar in construction to the standard trolley used on light traction cars, except that they are provided with ball bearing swivel harps.

The collectors will permit a deviation of ten feet on either side of the overhead wires. The bus is equipped with electric heaters, electric lights and electric signals.

This bus makes a valuable addition to the growing fleet of trolley buses, from which the electric traction companies can select a suitable type to supplement their "rail service" in localities where complete street car service is not at present warranted.

The Trolley Bus in Toronto

The Toronto Transportation Commission has recently placed an order with the Packard Ontario Motor Company for four complete trolley buses for service in the city of Toronto. Bodies for these buses will be built by the Canadian Brill Co., and all electrical equipment will be supplied by the Canadian Westinghouse Co. The buses will be completely assembled in Canada by the Packard Ontario Motor Car Co. This is the first trolley bus installation sold for Canadian delivery.

The buses will be similar in construction to the demonstration vehicle completed by the Packard Motor Car Company on August 22, 1921, and already illustrated in the Electrical News. They will be used to furnish transportation service in the outlying districts of Toronto, which are at the present time inadequately supplied with service. The electrical equipment will be essentially the same as that used on the Packard demonstration bus mentioned above and on the bus recently completed by the St. Louis Car Co., and now in Detroit for demonstration purposes.

Toronto's Radial Vote

On New Year's day the citizens of Toronto again had an opportunity to express their viewpoint regarding the purchase of outlying radials terminating in the city, and a study of the vote is unusually interesting. On former occasions the majority in favor of radials had always been so great that the council would almost have been justified in going ahead with them, even under the unfavorable trade conditions that existed. It is now plainly evident, however, that the electors have had time to think the matter over carefully. Their first enthusiasm has had time to cool and the latest vote, though giving a slight—a very small—majority in favor of radials, indicates that the pendulum is swinging back very rapidly and that the people are now in a much more thoughtful mood and are counting their pennies much more carefully. Under the circumstances, we do not believe the city council will be justified in continuing negotiations for the taking over of these radials at the present time.

In reaching this decision, it is doubtless the case that the citizens of Toronto have been impressed and influenced by the tremendous expenditures that have been made by the city in recent years. However it may be in theory, it works out in actual fact that the prosecution of the municipal ownership idea, and its application to the various utilities, piles up the debt of a city to an appalling extent and increases the obligation of every property owenr in like proportion. It may be that, in many cases, individual citizens are not called upon to make good these obligations, but the fact remains that they must assume them and, apparently, the citizens of Toronto feel that for the time being they have assumed enough. We believe they are right and that the city council have a clear mandate, at least for the present year, to let this matter drop.

The situation with regard to the purchase of the N. S. & T. Railroad by the municipalities through which this road passes, is different. These municipalities are not already loaded with debt as is the city of Toronto, and they only are in a position to judge whether the road is being operated at the present time to meet the demands of the district. While Premier Drury has set his face against the province guaranteeing bonds to build or purchase radials at the present time, he does not object to the municipalities concerned assuming these obligations if they are in a position to do so. The vote on January 1st indicated that the municipalities served by the N. S. & T. would prefer to control this road themselves rather than leave it with the Dominion Government.

Looking at it another way, the question was whether an electric road would be best operated by the Dominion Government or by the Hydro-electric Power Commission. When we consider that the management of the Canadian National Railway System is concerned chiefly with the operation of steam roads and that the Hydro-electric Power Commission has already a well established and equipped department for the operation of electric railroads, it would appear that the municipalities, in asking that these roads be turned over to the Hydro, have made a wise choice. The municipalities that have voted on the question appear to be of one mind on the matter and if the remaining municipalities, in which the vote will be taken, we understand, in the near future also endorse the scheme, the N. S. & T. will doubtless be handed over to the Hydro for operation in the near future.

Employees Get 6 per cent on Savings

The Ottawa Electric Railway Company are trying out a generous plan with their employees whereby savings accounts are accepted and interest paid on deposits at the rate of 6 per cent per annum. Mr. F. D. Burpee, manager of the company, has announced that they will accept loans from their employees at the same rate of interest that they have been paying the banks, namely six per cent, the only condition being that the employees must not withdraw their money frequently. In this way the company hopes to minimize the bookkeeping requirements connected with such a system. Up to the present time several thousand dollars of employees' savings have been deposited in this way and the arrangement will be continued if it meets with considerable response from the employees. The relations between the Ottawa Electric Railway Company and its employees have always been cordial, and generous treatment of this kind will naturally tend to maintain that condition.

Renew Franchise by Heavy Vote

The electors of the city of Ottawa have voted by a large majority in favor of giving the Ottawa Electric Railway Company, whose present franchise expires next year, a new franchise for thirty years more. This company has given a good service but, more than that, has made a point of keeping the public informed on the problems that daily confront the operators of a street railway system. This policy has now proven its worth and will justify Manager F. D. Burpee in continuing his fixed policy that the public, when properly informed, and left alone, can generally be depended upon to make a sane judgment.

Will Electrify M. C. R.

The vice-chairman of the London & Port Stanley Railway System, Mr. Phillip Pocock, stated recently that he had been informed that the Michigan Central Railway Company was considering the electrification of its Canadian line between Niagara Falls and Windsor. He considered that the starting up of the new power plant at Chippawa would have a considerable bearing on this project.

The Department of Mines, Ottawa, has issued a booklet, No. 564, entitled "The Preparation, Transportation and Combustion of Powdered Coal," by John Blizard.

Current News and Notes

Annapolis Royal, N. S.

Mr. S. Rippey, Annapolis Royal, N. S., has been awarded the contract for electrical work on a skating rink and exhibition building being erected on St. Anthony St., Annapolis Royal, for Mr. F. J. Barnum.

Brantford, Ont.

A report states that when the Norfolk Telephone Company increased their rates last year, hundreds of their farmer subscribers refused to pay more and had the telephones removed from their homes. After being several months without the convenience of a telephone in the home, a number of farmers commenced negotiations with the company for the installation of 'phones, at lower rates. An agreement has finally been reached between the two parties, at the following rates:—

Simcoe Central, $17.50 per annum; Waterford Central, $16.50; Port Dover Central, $16; Delhi Central, $16; Scotland Central, $15.50; with a toll of five cents for each call from any one exchange to any point on any other exchange in the system. The toll for the town of Simcoe remains the same.

The company agrees to replace all telephones that had been removed since July, 1921, free of charge, if notice to replace is received within 30 days from the date the board ratifies the agreement. After this a charge of $3 will be made.

Cayuga, Ont.

The town council of Cayuga, Ont., are contemplating the installation of a hydro system in the near future.

Chicoutimi, Que.

Messrs. Gilbert & Frere, Chicoutimi, Que., have been awarded the contract for electrical workon a $50,000 residence recently erected on Seminaire Road, Chicoutimi, for Mr. Louis Gagnon of that place.

Conestogo, Ont.

The Conestogo, Ont., town council are contemplating the installation of an electric lighting system for the town. The chairman of the council is Mr. H. W. Elber.

Fredericton, N. B.

The Province of New Brunswick is calling for tenders for bonds to the value of $1,800,000 for hydro-electric development and highway construction. These bonds will bear interest at the rate of 6 per cent, payable in Canada, and 5½ per cent, payable in the United States. They will run for a period of five years.

Halifax, N. S.

A draft of a contract has been prepared by a special committee appointed for the purpose whereby the city of Halifax will take over the St. Margarets Bay development, at cost, from the Provincial Water Power Commission.

The property of the Nova Scotia Tramways & Power Company, Halifax, N. S., suffered damage estimated at around $15,000 when ablizzard visited that city in the early part of January.

Hamilton, Ont.

The Ontario Gazette announces the incorporation of the S. U. & W. Electrical Manufacturing Co. Ltd., with a capitalization of $40,000. The new firm is authorized to manufacture and deal in all types of electrical machinery, appliances, etc. Head office: Hamilton, Ont.

Kincardine, Ont.

Mr. C. H. Wheeler, Kincardine, Ont., has been awarded the contract for electrical work on a $25,000 skating rink recently erected at that place.

London, Ont.

The Bowley Electric Co., London, Ont., has been awarded the electrical contract on a $10,000 gasoline station recently erected at Burwell & Dundas Sts., London, for the Canadian Oil Company, Ltd., London Junction.

It is stated that one of the first acts of the London city council for 1922 will be to revive the agitation for the electrification of the London, Huron & Bruce branch of the Grand Trunk Railway.

Meaford, Ont.

An enabling by-law was carried by the electors of Meaford, Ont., on New Years day. The electors also voted in favor of appointing a commission to handle the water works and electric power question.

Milltown, N. B.

The electrical contract on a new $90,000 school, recently erected at Milltown, N. B., has been awarded to Mr. H. D. Balkenay, Calais, Maine.

Montreal, Que.

Mr. A. Lafond, 470 Laval St., Montreal, has been awarded the contract for electrical work on a $25,000 residence recently erected at Sherbrooke & Addington Sts., Montreal, for Mr. A. Poirier, 347 De Lanaudiere St.

Mr. W. D. Michand, 28 Lorne Ave., Montreal, has secured the contract for electrical work on a business block being erected at Bleury and St. Catherine Sts., Montreal, for Mr. A. H. Jassby, 4378 Western Avenue.

Messrs. Vallee & Hamelin, 1867 St. James St., Montreal, have been awarded the contract for electrical work on a chapel being eretced on Ontario St. East for the Parish de la Nativite, 306 Desery St., Montreal.

Mr. J. A. St. Amour, 2171 St. Denis St., Montreal, has secured the contract for electrical work on an addition being built to the Ste. Justine Hospital for Children, St. Denis St., Montreal, at an estimated cost of $225,000.

Mr. A. Lafond, 470 Laval St., Montreal, has been awarded the contract for electrical work on a synagogue being erected at Duluth and City Hall Avenues, Montreal, for the Betha Juda Congregation at an approximate cost of $90,000.

Niagara Falls, Ont.

The Central Electric Co., Niagara Falls, Ont., has been awarded the electrical contract on a $70,000 theatre recently erected on Main Street, Niagara Falls, for the Drummond Hill Realty Co.

Oshawa, Ont.

Business was demoralized and the street railway system completely tied up for several hours in Oshawa, Ont., in the early part of December owing to an interruption in the hydro service, caused, reports state, by ice conditions in the Trent River.

Ottawa, Ont.

The Canada Gazette announces the incorporation of The Mis-Can-Ada Manufacturing Company, Ltd. The new firm will take over the business of the Mis-Can Ada Manufacturing Company, Ottawa, who formerly manufactured electric washing machines and vacuum cleaners. The company is capitalized at $65,000. Head Office: Ottawa, Ont.

The Canada Gazette announces the incorporation of The James Weir Company, Ltd., with a capitalization of $12,500. The new firm will manufacture and deal in insulating varnishes, protective coatings, insulating compounds, etc. The head office of the company will be at Toronto, Ont.

Palmerston, Ont.

The Palmerston, Ont., town council are planning improvements to their electric lighting system. A by-law was recently passed for the expenditure of $6,000 for this work. The council plans to rebuild part of line, change secondary system from 2 to 3 wires, using No. 2 copper conductors; change 30 services from 2 to 3 wires, including meters, and instal 20 new 3-wire and 30 2-wire services.

St. Catharines, Ont.

Karl Wildern, district plant chief of the Bell Telephone Company, died on January 5. He came to St. Cathraines from Niagara Falls three years ago. Prior to that he had served the Bell Company in London, Windsor, Owen Sound and Woodstock, having been in their employ since 1891.

Sarnia, Ont.

Mr. J. Filsinger, Christina St., Sarnia, Ont., has secured the contract for electrical work on a new store recently erected at Milton & McGibbon Sts., Sarnia, for Mr. Wm. Allaire.

Simcoe, Ont.

The Utilities Board of Simcoe, Ont., of which Dr. A. T. Sihler is chairman, is considering the installation of additional equipment, their present system being badly overcrowded.

Toronto, Ont.

At an "At Home" to celebrate the increase in users of their telephones from 40 to slightly over 100,000 in 42 years, the Bell Telephone Co. presented Mayor Church with a reproduction of the first telephone invented by Alexander Graham Bell, and a present day desk telephone, both done in silver.

The Toronto Electric Co., 101 Duke St., Toronto, has been awarded the contract for electrical work on an addition recently built to the arena and gallery at Roselawn Ave., near Avenue Road, of the Toronto Hunt Club, 542 Oriole Road, Toronto.

Messrs. Moss & Stocks, 14 Prince St., Toronto, have been awarded the contract for electrical work on a $35,000 Club House recently erected on Don Mills Road, near Fulton St., for the Finnish Society, 214 Adelaide St. W., Toronto.

Messrs. Smart & Walsh, 57 Kildonan Drive, Toronto, have secured the contract for electrical work on three stores being erected on Danforth Ave., near Broadview Ave., for Messrs. Coneybeare Bros., 108 Danforth Ave., Toronto, at an estimated cost of $105,000.

Messrs. Harris & Marson, 81A Parkway Ave., Toronto, have been awarded the electrical contract on a $150,000 school being erected by S. S. No. 26, York Township, Ont.

The Ontario Gazette announces the incorporation of the Battery Repair & Service Co., Ltd., with a capitalization of $40,000. The head office of the company will be at Toronto.

Messrs. Nichol & Fagan, 111 Logan Ave., Toronto, have secured the contract for electrical work on five stores recently erected on Danforth Ave., near Bastedo, for Mr. W. W. Hiltz, 739 Broadview Ave., Toronto, at an approximate cost of $60,000. Also the electrical contract on six residences recently erected on Merrill Avenue E., near Moberly Ave., Toronto, at an approximate cost of $36,000.

Waterloo, Ont.

The Electric Service Co., Waterloo, Ont., has been awarded the contract for electrical work on an addition being built to the Waterloo factory of the Forsyth Productions, Ltd., of Kitchener, Ont.

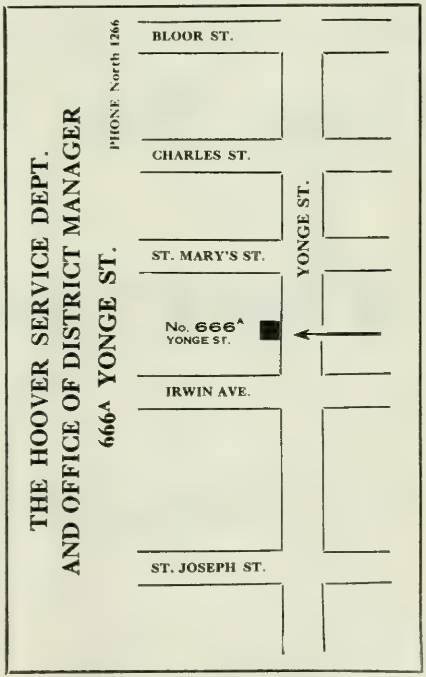
Whitby, Ont.

It is reported that in an endeavor to make hydro power available for heating, at a figure that would be within the means of the average householder, the Whitby Public Utitities Commission has decided to reduce the power rates. At present the rate to small consumers is three cents per kw.h. and two cents per kw.h. to large consumers. The latter rate is to be reduced but it has not yet been announced to what extent.

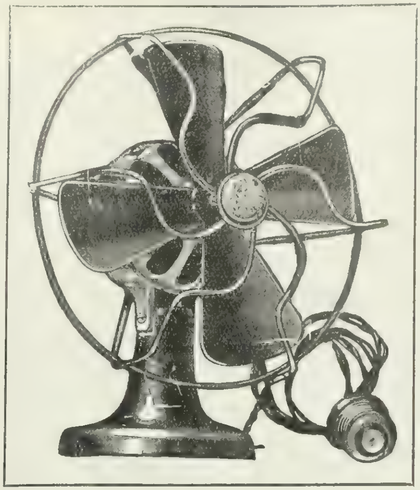
Winnipeg, Man.

The Star Electric Co., 185 Lombard St., Winnipeg, has secured the contract for electrical work on a Mission building being erected on Alexander Ave. at an approximate cost of $30,000.

The Swedish General Electric, Ltd., through their Western representatives, the Filer-Smith Machinery Company, Winnipeg, Man., have recently been awarded the contract by the City of Winnipeg Hydro-electric System for the supply and erection of five 45 kw. exciters for their Point du Bois generating plant. The machines will be built by the Swedish General Electric Company of Sweden.



Mr. Skelton announces his removal to new Toronto quarters



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Model G

Universal Motor 25 or 60 cycles 110 volts

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The Biggest Value on Earth

New features are: Highly Buffed Solid Brass Blades, Reservoir Oiling System, New Guards, Improved Motor.

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Toronto Electric Home Arousing Tremendous Interest

How's the Electric Home going?

So great is the interest, in Toronto, in the Electric Home campaign at present under way, that the inevitable query, when members of the fraternity meet, is "How's the Electric Home going?"

And the invariable answer is—"Tremendous success."

To begin with, the attendance is much greater than the committee in charge had dared to hope it would be. Eighteen hundred and fifty visitors were shown through the home after three o'clock on the opening day, and during the first five days the house was open more than 6,000 people were shown through it.

As a matter of fact, during the afternoon and evening the number of visitors is regulated largely by the capacity of the Home. It is an 8-room house of moderate size— just about the size and price the committee considered would appeal to the greatest number of visitors. During the evening some 18 or 20 demonstrators are constantly in attendance and it is a rare circumstance that these demonstrators are not fully occupied.

It is really too early to expect tangible results, but some of the electrical merchants are already reporting inquiries and requests from customers to come up to their homes and see if they cannot "fix up the wiring" something like the Electric Home they were down looking at. The various men's and women's organizations are being interested through a special publicity committee. The architects' association and the contractors, both general and sub-contractors, are being told about the Home and a special day is being set aside for them, when the general public will not be admitted.

One of the most satisfactory features of the whole campaign has been the support accorded the movement by the daily papers. Representatives of the different papers have been shown through the Home and given a thorough explanation of the underlying ideas. As a result, interesting articles, written by the young lady representatives themselves, are appearing from day to day and are doing much to explain the whole campaign to the general public. These articles are pointing out, for example, that while the average householder may not feel disposed to purchase at one time all the electrical equipment shown in this model home, he will nevertheless, doubtless expect to do so as the years go by, adding a washing machine one year, an ironing machine the next, etc. In this connection they point out the absolute necessity of laying the proper foundation for the use of this equipment when the house is built, by having the home properly wired, at a comparatively small additional expense. These articles emphasize, also, the necessity of having this work done by reliable contractors, using the most approved methods, for example, a ceiling outlet in the laundry; a fixed heater in the bathroom; wired furniture such as dining room table and tea wagon; light, as one of them aptly puts it, "in the darkest holes in the house—the clothes closets and cupboards;" the proper placing of switches to save steps; an ample supply of outlets so that appliances may be used where they are needed, etc.

At the formal opening of the Home on Saturday, January 21, Mr. P. W. Ellis, chairman of the Toronto Hydro-electric Commission, officiated as master of ceremonies. He briefly, but very enthusiastically, outlined the advantages of the use of electricity in the home and its great possibilities for placing the standards of living of the average man and woman on a higher plane. Mayor McGuire also spoke briefly, and Mrs. John Bruce, president of the Women's Canadian Club, officially opened the Home with a golden key provided for the purpose. Mrs. Bruce aptly remarked that she felt "like a good fairy opening the door of Fairyland where Electricity was the housekeeper, and household worries were forgotten." The exhibit will remain open until the evening of February 4th. After an interval of approximately a month two other Electric Homes, which will be fitted up in the meantime, will be opened to the public, one in the east end and the other in the west end of the city.

New Zealand Electrical Merchandizer Visiting Canada on Buying Trip

Mr. C. A. Seager, manager of the Auckland branch of Messrs. Turnbull and Jones Ltd., electrical engineers and contractors, who are represented throughout New Zealand by five branches, is visiting Canadian cities. The object of his trip to Canada, is to get in touch with Canadian manufacturers of electrical appliances.

Messrs. Turnbull and Jones Ltd., have in the past been buying, in large quantities, goods manufactured in the United States, the only reason for this being that they were not aware of the fact that similar lines were obtainable in Canada, as the Canadian manufacturer has never had a representative in New Zealand, nor has he made any apparent attempt to introduce his goods through the mails.

During the past three months, the government of New Zealand has introduced a new custom tariff, which includes a preferential rate of 15 per cent on electrical goods manufactured within the British Empire. When this announce-

[illegible] Mr Seager received instructions from the directors of his company, to proceed to Canada at once, to ascertain what lines of electrical goods were being manufactured in Canada, and if prices and quality are right, to place orders in the Dominion.

Now Keeping to the Right in Coast Province

After two weeks of the new "Rule of the Road" -"Keep to the Right" ---British Columbia cities served by electric railways are beginning to settle down to the new order as a matter of course. It has been amazing, in such centres as Vancouver and Victoria, to see how well the change has been carried out. Not a little of the credit for this success is due directly to the organized efforts of the B. C. Electric Railway Company, which has for six months past been busy on the problems arising from the change. It has taken much thought and an enormous amount of labor to make advance preparations and be ready to instal the change-over at practically a moment's notice. The rule went into effect at midnight Dec. 31, and the great task was to complete the turning of all the switches on the system in readiness for the starting of traffic at 6 a.m. Jan. 1st. It was fortunate that the New Year came on Sunday, bringing with it a holiday on Monday. That made two days light traffic, which gave the workmen a little better show.

The casual observer, who might deem that it was only necessary to "turn the cars around and run them on the opposite track," would have been amazed to inspect the work which has been carried on at the B. C. Electric car barns for some months, when doors and platforms, on every car were being altered as the keeping up of the service permitted. With but few spare cars, much of the work had to be done at night. Gradually, as some cars were changed they were put on the road and others taken in. By that means most of the rolling stock had the preliminary work of right hand platforms and doors ready. But it was not possible to put on steps, hand-rails and other projecting appliances while still running to the left. That work, and the closing temporarily of the left hand openings and the removal of steps from left side, had all to be done during the last night of the old year. A large extra force completed the work on a sufficient number of cars to keep up the schedule next morning.

It took a street force of fifteen extra gangs making the track changes on the last night of 1921. Eight tower wagons, some of them temporarily erected on motor trucks were put in commission, and an extra wiring gang with each, to make the changes in trolley overhead switches at the same time. In the car barns a large force of carpenters and workmen was busy making the changes from the moment the first car came in off the run, until the next morning when 160 were ready in Vancouver alone. One of the operations which was well advanced was that of changing the cross-over switches to the opposite direction. All but the electric wiring control of these was finished some time before the change.

Indicating the cost of the extensive changes required, the provincial government a year ago, in enacting the legislation for the change, decided to advance to the B. C. Electric Company a sum not to exceed $400,000. computed as half the cost of the necessary work.

Prince Rupert May Build Plant

The city of Prince Rupert, in 1914, installed a development plant with a capacity of 1,650 h. p., on the Shawatlans River. During the war this supply satisfied the demand, but within the last couple of years it has become evident that a further development, either by an extension of the present plant, or by the installation of an entirely new plant, will be essential.

The Shawatlans power site is capable of developing another 1,000 h. p., but a second development on the Thulme River, distant only some thirty miles from the city, is estimated to have an ultimate capacity of 20,000 h. p. Figures have been prepared on the cost of this latter development, by T. C. Duncan, superintendent of utilities, Prince Rupert. This estimate provides for an initial development of 2,000 h. p. with dam and transmission line capacity of 8,000 h. p., for $550,000. At last reports, the council was considering which of the two developments would be in the best interests of the city, but it is likely that the larger one can be shown to promise much better ultimate results.

Canada's Favorable Position

Canada has her troubles. They are the lesser problems of resumed growth, not of reconstruction. She has no war currency to deflate. Her budget practically balances. In foreign trade her cash position is stronger than a year ago. Her production increases. No other country in the world can point to the combination of all these factors in January, 1922.

If the course of exchange be the true augury of 1922 eventualities, the Canadian outlook is 100% better than a year ago. The new year opened with Canadian dollars at a 5% discount. The old year began business with Canadian dollars worth 85 cents apiece in New York.

In the particulars which receive first consideration when methods of actual reconstruction are authoritatively discussed, currency, budget and foreign trade, the Dominion satisfies the requirements of international credit.

But for railway investments, public revenue for two-thirds of the current fiscal year would exceed expenditure by a surplus almost again as large as the deficit of $26,000,000 disclosed. Revenue is larger than in 1920.

Originating a generation ago, the Canadian railway problem outranks all others in fundamental importance. But it has always been and remains a detail of growth, huge as it bulks today.

Actual gain in cash position of Canadian foreign trade is stronger by $150,000,000 than 12 months ago. Both exports and bank clearings have declined less than our own.

Land values have happily escaped most of the inflation which carried wheat on the ground from 70 and 80 cents a bushel to $2 and $3. Pessimism, faithfully portrayed by commercial reviews, in their New Year's greetings, has, as was human, run riot in western mercantile centers. The fundamentals, calling for more industry in compilation, have been neglected.

Grain production is of record size. At the lowest prices since 1915 the farmer receives more real value of all kinds out of those prices than wheat boards could ever bring to him. Land values at least have not to undergo the sharper wrenches of deflation.

Immigration sets in. Building revives and building costs decline. Production increases. Where is the outlook better or as good? —Barron's Financial Weekly, New York.

Kilovolt-Ampere Measurement and its Effect on Power-Factor

By S. L. B. LINES
General Manager Lincoln Meter Company before the A.M.E.U. Convention Jan 26, 27

Broadly speaking the power factor at which a municipality buys power, is caused by two conditions.

(1) The exciting current of the distribution transformers.

(2) The loading conditions of the various customers.

It is the purpose of this paper to deal with some of the factors connected with (2).

For the purpose of simplifying the analysis we will divide the customers into three very general classes: Residential, Commercial, Power and Industrial.

The residential customers' load is almost entirely of the non-inductive type, i.e. cooking, heating and illumination, all of which give good power factors. Fans and small utility motors form an exceedingly small portion of the total load. Therefore this type of customer in general tends to improve the power factor, rather than create bad conditions.

The commercial customer is primarily a lighting and heating customer but may have motors of a sufficient total to adversely affect the power factor. To determine whether this be the case or not, it is necessary to study the individual load.

The power or industrial customer is the one usually responsible for bad power factor. The extent to which this is the case is not generally realized. An analysis recently made in a 60-cycle district showed the power factor of the average machine shop to be between 60 and 70 per cent at maximum load.

It is the practice of the Hydro-electric Power Commission to bill municipalities on 90 per cent of the maximum demand in watts if the actual power factor is below 90; if above 90, on the maximum demand in watts.

Some actual bills to municipalities within the past six months show what an effect this has on their monthly statement.

Muncipality A.

Bill without power-factor correction	$413.00
Bill with power-factor correction	$477.50
Increase	$64.50

Municipality B.

Bill without power-factor correction	$3,860.00
Bill with power-factor correction	$4,760.00
Increase	900.00

Municipality C.

Bill without power-factor correction	$18,930.00
Bill with power-factor correction	$21,300.00
Increase	$2,370.00

Municipality D.

Bill without power-factor correction	$652.00
Bill with power-factor correction	$766.00
Increase	$114.00

In analyzing the charts of "Municipality A" on the same day and time as that of maximum demand upon which their bill was based, we find that they have an industrial load of 95.5 horse power at 80 per cent. power factor. If, however, the industrial load has been taken at 90 per cent. power factor this would have resulted in the total being taken at 87 per cent. power factor, or a saving of $51.00 per month. The conditions which increase the bill to this extent should either be corrected or passed on to the customer or customers responsible. Since, however, it is not usually possible by peace-persuasion to get the individual customer to amend his ways, even if he can, the second alternative should be adopted, i.e., pass the cost on to the customer responsible. It will, I believe, be readily admitted that this should be done, as the only alternative is to charge all customers, good, bad and indifferent alike, a higher rate to cover up the sins of the few.

Some Municipalities Have Tried Methods

In some municipalities an endeavor has been made to do this in one or other of two ways; one, to have testers visit the premises of the various customers from time to time and take tests; the other, by means of two graphic meters—one reading watts and the other reactive kv.a.

The first method is better than nothing, but the cost is considerable and it has the objection that one cannot be sure that the power factor at time of test is the same as power factor at maximum demand. Thus errors in billing may creep in either for or against the customer.

The following examples were taken on six customers in one of our large cities, chosen at random,—

Toy Manufacturer

Demand	19	h.p.
Power factor by periodic test	80	%
Power factor by measurement	69	%
Error	11	%

2. Leather Manufacturer

Demand	25	h.p.
Power factor by periodic test	45	%
Power factor by measurement	45	%
Error	None	

3. Tannery

Demand	35	h.p.
Power factor by periodic test	71	%
Power factor by measurement	86.6%	
Error	15.6%	

4. Chocolate Manufacturer

Demand	45	h.p.
Power factor by periodic test	85	%
Power factor by measurement	74	%
Error	11	%

5. Embroidery Manufacturer

Demand	25	h.p.
Power factor by periodic test	85	%
Power factor by measurement	91	%
Error	6	%

6. Textile & Knitting Mills

Demand	550	h.p.
Power factor by periodic test	85	%
Power factor by measurement	78	%
Error	7	%

Other municipalities, however, have neglected the question of power factor measurement and some results obtained in cases of this sort may be of interest,—

1.	16 kilowatts demand; power factor taken as	85	%
	Test showed	47	%
2.	190 kilowatts demand; power-factor taken as	90	%
	Test showed	66	%
3.	90 kilowatts demand; power factor taken as	90	%

Test showed 71.5%
[illegible] demand; power factor taken as ... 85 %
Test showed .... 54 %
5. [illegible] demand; power factor taken as ... 85 %
Test showed 66.6%
6. 45.8 kilowatts demand; power factor taken as .... 85 %
Test showed .... 57 %

The second method, i.e., using the two graphic meters, is so costly that it can only be applied to very large customers. The question therefore arises:—are there not some other methods by which one can make a just charge to each industrial customer? Let us compare the costs of the methods available at present.

Method 1.

Two graphic meters as mentioned above, one to read watts and the other reactive kv.a. From these two readings a power factor can be accurately determined. The cost varies from $385.00 to $780.00 according to the type of graphic used, plus transformer cost.

Method 2.

The use of two indicating demand meters connected as in method 1. This arrangement will give fairly accurate results, but since the maximum watts and r.kv.a. may not coincide, due to fluctuations in voltage, an error may be introduced which would be unfavorable to the customer. The amount of the bill would no doubt be questioned. The cost of this method varies from $117.00 to $126.50.

Method 3.

The use of a graphic kv.a. meter. This arrangement gives accurate results. The cost varies from $275.00 to $280.00.

Method 4.

An indicating kv.a. meter giving accurate results and costing $72.00 to $79.00.

From the point of view of the cost and accuracy, the choice, therefore, rests between 3 and 4.

Method 3 should be chosen where a graphic record is required or justified. Generally speaking, on 100 horse power, or over, the expense is warranted. Method 4 is preferable where a graphic record is not justified.

We have arrived at the point where the instruments available make it highly desirable that both large and small customers be measured in kv.a. It is now well, perhaps, to run over rapidly what is meant by kv.a.

In a direct current circuit, kilowatts are the same as kilovolt amperes. In an alternating current circuit, this usually is not the case, because the question of power factor comes in. In this case watts are equal to volts multiplied by power factor (which is always less than one) whereas the volt amperes are product of the volts by amperes, neglecting the power factor. Therefore, a volt ampere reading is always higher than a watt reading.

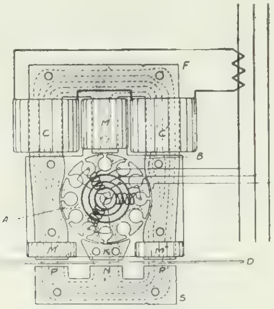

Fig. 1.

There are two types of graphic meters for measuring kv.a. on the market.

The Instantaneously Responding Meter

"Instrument A" is of the instantaneously responding type. It has the advantage of reading kv.a. on balanced loads at any power factor but penalizes the customer on unbalanced loads. It is a question whether this is a desirable feature or not. The Standard Interpretation of Rates and Contracts by the H. E. P. C. at present existing, do not permit of a penalty for unbalance. Therefore this instrument should not be used unless it is known that the load is balanced.

This instrument has the standard form of metering discs such as are found in an integrating watthour meter. An integrating wattmeter measures kilowatts because at the time the power factor departs from unity, the phase relation of the magnetic fields, (produced by the current and voltage cutting the meter disc) is charged. If the relation between these magnetic fields is maintained on varying power factors, then the instrument will read kv.a.

Figure 1 is an illustration of the magnetic circuit, shown in the single phase form for simplicity. The frame F is magnetized by the current coils C and C^1. The potential element A is mounted in the space of the frame, so as to be free to rotate. It does not, however, revolve like an armature of an ordinary meter, but changes its position only with the changes of power factor. The potential element A carries a polyphase winding which when energized, produces a rotating field about its periphery. The flux of the frame divides, the major portion passing across the gaps between the frame and the yoke S, cutting the disc at P and P^1. The remainder of the flux crosses the path formed by the potential element at N. There is a reaction between this portion of the current field and the potential field. Therefore, the element A, which is free to rotate, will assume a position whereby the potential field is in phase with the current field.

A Rotating Element Maintains the Phase Relationship

If the power factor of the circuit changes, causing one of the fields to lead or lag, the potential element rotates enough to re-establish this phase relationship. The element A does not move except to shift in either direction with changes in power factor. However, a flux is produced by the polyphase potential winding on it which rotates about its periphery at synchronous speed. The path of this potential flux through the disc between K and N is at right angles to the potential flux path, from pole to pole through A.

The element A, always shifts so that the potential field is in time phase with the current field across the polar space, but with the element A, in this position the potential field across the disc between N. and K. will always be in time quadrature with the current field. This being the case, the torque on the disc is the same as if the power factor were maintained at unity. Therefore, the instrument measures volt amperes.

Upon the spindle of the meter disc is mounted a pen which writes on the chart. This is similar to the arrangement in standard graphic instruments.

Description of the Demand Type of Meter

"Instrument B," is of the demand type and does not penalize the customer for unbalanced loads. It can therefore be used under any conditions, with the present wording of the contracts. It is limited however, in the range of power factor under which it will operate accurately. In its standard form, it covers power factor from 43 to 90 per cent. lagging by the use of two sets of taps, but by the means of special taps it can be made to cover any desired power factor.

Method 4.

As far as the writer is aware, there is at present only one type of indicating kv.a. outfit available. It employs the same priciple as the second type of graphic kv.a. meter. The principle of operation is to apply to demand wattmeter a small external transformer. The purpose of this transformer is to bring the voltage and current in the circuit into the correct phase relation and to do away with the phase difference existing when the load is operating at power factors other than unity. It is immaterial whether the angular position of the current or voltage is shifted, as long as the two bear their correct relationship.

An inductive load causes the current to lag behind the voltage. If therefore we can cause the voltage to lag also, and by the same amount, we have the desired results and any standard wattmeter is caused to read kv.a. instead of watts. By means of the small transformer already referred to, the voltage is given the required movement backwards. The line voltage is applied to A B and C. (Fig. 2). Instead of C B being applied to the potential coil of the meter, 2-7 are connected for the one phase. Instead of A C being connected to the other potential coil of the meter, 7-5 is used. It will readily be seen from the diagram that this has shifted the voltage 53.13 degrees away from its original position. This angle is the same as the lag in the current with a load at 60 per cent. power factor and the meter will now read the product of the volts by amperes, providing the power factor under measurement is 60 per cent. Furthermore, the power factor of the load can vary very materially without introducing an error of more than 2 per cent. as shown in Fig. 3.

Taps in the transformer, of which Fig. 2 is a diagramatic sketch, can be taken out at various points and the voltage caused to be in operative harmony at any desired power factor.

Comparative Methods

When the contract is based on a charge per horse power plus an adjustment for power factor, the procedure would be as follows,—

Either measure the demand in watts obtaining the power factor, from the tester who has visited the factory, and work out the formula as follows,—

Kw. demand reading multiplied by .746 to convert to horse power. Then multiply by the allowable power factor over the actual power factor.

It will be noted that both these multipliers increase the readings of the meter.. To measure the customer in kilovolts amperes of demand, cut out the testing on the customer's premises, with its uncertainties, and the formula then becomes as follows,—

$$\text{kv.a. x } \frac{1000}{746} \text{ x } \frac{\text{allowable p.f.}}{100}$$

It will be noted that in this case that only one of the multipliers increases the readings. The other decreases it. Although the results of both formulas are the same, the customers are not as apt to feel quite so badly dealt with as where both multipliers increase the meter reading. An actual example of each method shows that the results obtained are exactily the same.. A customer with 60 kilowatt on his meter, whose power factor is found to be 50 per cent. on tests. would have his bill worked out as follows:—

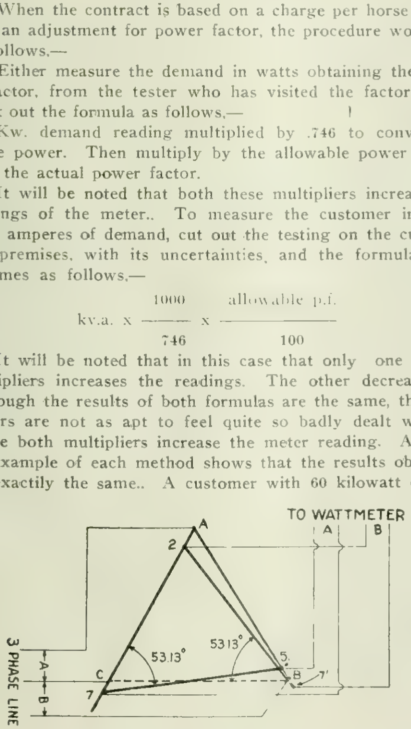

Fig. 2

$$60 \text{ x } \frac{1000}{746} \text{ x } \frac{85}{50} \quad 137 \text{ h.p.}$$

A kilovolt-ampere reading of the same customer would be worked out as follows.

$$120 \text{ x } \frac{1000}{746} \text{ x } \frac{85}{100} \quad 137 \text{ h.p.}$$

Power Should be Sold on kv.a. Basis

I would at this juncture put in a plea for the sale of power on a kilovolt-ampere basis in place of horsepower plus a power factor penalty. There are no instruments measuring horsepower. They all measure in watts or volt-amperes. This fact means that the meter reading must be multiplied by a factor which increases the figure appearing on the bill. The power factor penalty means, first, that the power factor must be measured and, secondly, that a multiplier has to be used which again increases the reading. By the time one has finished with the average layman, he is properly fogged. I am sure he will go away with the impression that most electrical engineers ought to be in jail. Whereas if power was sold at so many dollars per kilovolt-amperes (instruments now being available to measure this quantity) the reading would be taken from the meter, multiplied by dollars and cents and the total bill arrived at without any further figures or multipliers. The objection may be raised that the customer will not understand what a kilovolt-ampere is. This same objection was raised to the change which took place on lamps. Carbon lamps were all sold by the candle power whereas lamps to-day are sold on the watt basis and our better halves talk just as glibly about 25 and 50 watts today as they did in the old days about 16 and 32 candle power. It would appear reasonable to assume that the individual customer would learn just as rapidly what a kilovolt ampere is as compared to the somewhat ambiguous term "electrical horse power."

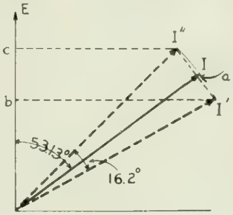

Fig.3

May I point out that when a farmer, who has one horse doing a short time job, comes to install electrical power, he finds he has to have two of the electrical variety to do the same work. Electricity is somewhat belittled in his mind right at the start. Whereas if he was told that he required two kilovolt-amperes to to the work of one horse, he would be entirely satisfied. When his bill came in, if he were able to read the meter, his reading and the bill agree.

I will conclude by giving two sample bills together with the necessary calculations in each case;—

Load 100 h.p. at 50% p.f.

Watts Demand Corrected for p.f.	Kv.a. Demand
Price per h.p., $1.25	Price per Kv.a. $1.51
Meter reading, 74.6 kw.	Meter Reading 149 kv.a.
P. F. found by test, 50%	149 x $1.51 = $225.00

$$74.6 \text{ x } \frac{1000}{746} - \text{h.p.} = 100$$

$$100 \text{ x } \frac{90}{50} \text{ (to correct for p.f.)} - 180$$

180 x price per h.p. = Bill
or 180 x 1.25 = $225.00

Further Progress of Rural Distribution

By J. W. PURCELL

Assistant Engineer Hydro-electric Power Commission of Ontario*

The tendency of the present times in rural districts is toward the use of power in different forms for field work, in the barn, and to a lesser extent in the house.

The western provinces of Canada and the United States have for a long time used the tractor for field work, but have found the large tractor too heavy, too unwieldly, too cumbersome for their needs and for their soil; the natural result has been the discontinuance of the use of it to a great extent; the small tractor coming during the war has been adopted quite generally in the West and East. There have been, and are extremes in the applications—in the East we find farmers purchasing tractors and not reducing the number of horses on the farm—in the West there are men like Schaal, twenty-five miles, southwest of Winnipeg, who operate 10,200 acres with no horses and no stock, but forty tractors; each one hauls two fourteen inch plows, and they plow an acre every 2 minutes; 12 foot drills seed 640 acres a day. In harvesting they cut and stook a section (640 acres) per day. Mr. Schaal, Sr., claims power cheapens production and increases profits by horseless farming.

We, however, are not interested in the sale of tractors excepting in the general application of power to farm work but we do not think it is unfortunate that millions of dollars should be expended on this form of power, when by doing so they feel they are not justified in making a smaller expenditure to equip their places with hydro-electric power, which would give them a greater service both in the house and barn, at only a fraction of the cost per annum.

Our Ontario farmers, however, in most cases have not considered the needs in the house as serious until recently. The wives and women of the country have been granted the franchise, and apparently this has affected their status to the extent that they now enter into discussions in many of the meetings,and are not backward in stating their views. The following table prepared by the U. S. Dept. of Agriculture shows the distribution of the work of the farmer's wife and the equipment she has to do the work. The notation at the bottom, by way of advice to manufacturers and distributors is a timely suggestion to the manufacturers, distributors and merchants in Ontario.

Shortly before the June convention of this Association, the Legislative Assembly of the Province of Ontario passed legislation authorizing the bonusing of rural power distribution primary lines whereby these lines would be bonused up to 50% of their cost, at the time they are constructed.

The Commission was advised that for the present the Province would bonus the primary lines to the full amount of 50%, so that all estimates sent out and rates given are based on this assumption.

Late last year the Commission found it necessary to classify rural service, using as a basis for each class the demand of such class of service, based on the average demand from our experience in service to a large number in each class. The following excerpts from the letters to townships giving rates, gives the classifications and the description of the service each may be applied to as well as the estimated service charge, the estimated annual cost, the class demand in kw., and in h.p. the average monthly kw.h. and an estimated total cost based on power at 5 cents per kw.h. for the first 14 hours use of the class demand, with a follow up rate of 2½ cents per kw.h. The Service Charge and total cost are given for both frequencies as there are some representatives here from districts using each, and it may be well to have these figures handy when your farmer friends come in to inquire about probable costs for service in your district.

Class 1—Hamlet service includes service in hamlets, where four or more customers are served from one transformer. This class excludes farmers and power users. Service is given under three sub-classes as follows:—

Class 1-A—Service to residences where the installation does not exceed six lighting outlets or twelve sockets. Use of appliances over 600 watts is not permitted under this class.

Class 1-B—Service to residences with more than six lighting outlets or twelve sockets, and stores. Use of appliances over 750 watts permanently installed is not permitted under this class.

Class 1-C—Service to residences with electric range or permanently installed appliances greater than 750 watts. Special or unusual loads will be treated specially.

Class II—House Lighting—Includes all contracts where residences cannot be grouped as in Class I. This class excludes farmers and power users.

Class III—Light Farm Service—Includes lighting of farm buildings, power for miscellaneous small equipment, power for single phase motors, not to exceed three horsepower demand, or electric range. Range and motors are not to be used simultaneously.

Class IV—Medium Single Phase Farm Service—Includes lighting of farm buildings and power for miscellaneous small equipment, power for single phase motors, up to 5 horsepower demand, or electric range. Range and motor are not to be used simultaneously.

Class V—Medium 3-Phase Farm Service—Includes lighting of farm buildings and power for miscellaneous small equipment, power for 3 phase motors, up to 5 horsepower demand, or electric range. Range and motor are not to be used simultaneously.

Class VI—Heavy Farm Service—Includes lighting of farm buildings and power for miscellaneous small equipment, power for motors up to 5 horsepower demand, and electric range, or 10 horsepower demand without electric range.

Class VII—Special Farm Service—Includes lighting of farm buildings, power for miscellaneous small equipment, power for 3-phase motors from 10-20 horsepower demand, and electric range.

Class VIII—Syndicate Outfits—Includes any of the foregoing classes which may join in the use of a syndicate outfit, provided the summation of their relative class demand ratings is equal to the kilowatt capacity of the syndicate.

The estimates on the cost of power delivered to users as herein set out have been based upon certain assumptions, some of which are as follows:—

The construction of the lines shall be undertaken and paid for by the Commission. The farmers in the vicinity of the roads along which the lines pass will assist in the construction and assistance will be paid for at a suitable wage. Lines constructed from the line on the highway to customers' premises will be paid for by the customer. The Commission proposes to supply the necessary expert labor to direct the construction of the lines and the installation of the equipment. It has been assumed that three farmers per mile of line, or the equivalent, are obtainable as an average for the entire district to be served. The supply of poles at low prices in the district or the vicinity of the district by efforts on the part of those desiring service will result in the reduction of the cost of construction and corresponding reduction in the cost of service. Co-operation resulting in the reduction of the cost of construction is desired. The rates herein set out are also based upon a government bonus of 50 per cent of the cost of primary lines constructed on the highway or along the right-of-way.

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*Convention, Jan. 26-7

Charges for power delivered shall consist of two parts, namely, the service charge and the consumption charge. The service charge which constitutes the greater portion of the total cost of power delivered, consists of the operating, maintaining and fixed charges of the lines and equipment required to deliver the power to the users in the district. Consumption charges will be determined by a meter at each customer's premises, which will measure the quantity of power used to which a suitable rate will be applied. This cost can only be arrived at when the amount used has been determined. The rate used in the district will be determined by the cost of power at the transformer station supplying the district. The power supplied to the district will be metered at the transformer station.

The meter rates for users in that part of your township will be supplied from.. are estimated as follows:—

5 cents per kilowatt hour for the first 14 hours use per month of customer's class demand rating.

2½ cents per kilowatt hour for all remaining uses.

Less 10 per cent for prompt payment.

The following table gives class demand rating, average monthly kilowatt hours, estimated consumption charge, estimated service charge, and total estimated annual cost for each class:—

Rural contracts have been developed to a form that agrees in principle and application to that which is in use in urban municipalities, excepting that in the former the liability is assumed collectively and benefits distributed individually through the municipality as a whole. Most service in rural districts is being supplied under Part II and Part IIB of the Power Commission Act as applied to individuals, therefore the liability in a district is assumed by this group of individuals, and any benefits accrue to them as individuals. The rural power contracts are covered by a guaranteeing agreement between the townships and the Commission.

Under legislation as revised in 1920, all new systems will be operated by the Commission. Distribution in districts such as yours, from existing or provided distribution centers, make this desirable. At the end of each year a statement will be rendered to each township in each district.

Construction in rural districts was discontinued in 1917 on account of the war, and by reason of high costs and unsettled conditions was not undertaken again until this year.

At the end of the fiscal year 1920 the Commission had

Farm services	1126
Hamlet services	857
Suburban services	4103
Suburban service on local records, about	2000
Total	8086
Miles of line	502.74
Townships in which service is given	81

During 1920, however, the legislation regarding rural distribution was revised with a view to more extensive construction than had taken place before. During 1919 and 1920 preparatory surveys were made over a large area in 68 townships, divided as follows:

Niagara system	30
St. Lawrence system	14
Eugenia system	3
Severn	3
Wasdell system	7
Rideau	3
C. O. S.	6
Ottawa system	2

Based on these surveys districts were laid out and submitted to the Government for approval.

Rates were approved for these districts on the assump-

TABLE NO. I. WHAT THE FARMER'S WIFE DOES—AND WHAT SHE HAS TO DO IT WITH

	Rooms to care for	Stoves to care for	Kerosene Lamps	Water to Carry		Wash and Iron	Sewing	Daily Mending Hours	Bread Making
				Percentage	Distance Feet				
	Average	Average	Percent	Percent	Average	Percent	Percent	Average	Percent
Eastern States	9.7	1.35	79	54	23	94	86	5	89
Central "	7.7	1.3	79	68	41	97	94	6	78
Western "	5.3	2.5	77	57	65	97	95	5	97
Average	7.8	1.6	79	61	39	96	92	6	94
No Records	9871	9210	9830	6611	6708	9767	9724	8001	9614

	Running Water	Power Machinery	Water in Kitchen	Sink and Drain	Washing Machine	Carpet Sweepers	Sewing Machines	Screened Windows & Doors	Out-Door Toilet	Bath Tub
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Eastern States	39	12	67	80	52	58	94	95	87	21
Central "	24	29	47	52	67	46	95	98	93	18
Western "	36	22	18	44	49	29	95	91	86	23
Average	32	22	48	60	57	47	95	96	90	20
No Records	9320	9080	6949	9334	9472	9513	9560	9667	9580	9784

What the farm woman needs, says the Department of Agriculture, and what she can be taught to buy, is more labor-saving equipment. In equipment the farm home is far behind the field or even the barn, with the result that the farm woman's task is no easy one. The Department looks to manufacturers and advertisers to do their share in improving conditions in the farm home, just as they have in other parts of the farm.

tion that a Government bonus of 50 per cent would be obtained and that the number of farmers signing contracts would not be less than three per mile.

The total number of townships included by these districts, and the number of townships adjacent to load centres, which might be served from H. E. P. C. lines, is 341 and the area covered is 17,365 acres.

TABLE NO. II.

Class	Demand Rating K.W.	Demand Rating H.P.	Average Monthly K.W.H.	Est. Annual Consumption Charge	25 Cycle Systems		60 Cycle Systems	
					Est. Annual Service Charge	Total Est. Annual Cost	Est. Annual Service Charge	Total Est. Annual Cost
I Hamlet Service. ...	(a) 1/2	2/3	10	4.68	17.59	22.27	17.08	21.76
	(b) 3/4	1	15	6.84	20.50	27.34	19.74	26.56
	(c) 2	2-2/3	150	48.12	36.44	84.56	34.42	82.54
II. House Lighting	1	1-1/3	15	7.92	30.05	37.97	25.40	33.32
III. Light Farm Service	3	4	40	21.60	60.82	82.42	55.76	77.36
IV. Medium single phase farm service	5	6-2/3	70	37.80	66.94	104.74	60.00	97.80
V. Medium 3 phase farm service..	5	6-2/3	70	37.80	84.50	122.30	76.04	113.84
VI. Heavy farm service	9	12	150	74.52	130.97	205.49	115.79	190.31
VII. Special " "	15	20	300	137.76	188.90	326.66	170.08	307 84

The above costs are calculated from our knowledge of the use of electric power in rural districts under average conditions They have been adjusted by applying the rates as set out herein.

The rates will be re-adjusted by the Commission from time to time in your district to cover cost. Increase in the average number of farmers per mile or lower cost of power will reduce the annual costs to all.

Authorization having been received with regard to these districts, meetings were advertised and held in all prominent centres, in order that the new procedure and rates might be explained to the residents of these townships. The first meeting was held on June 16, 1921 and to date the following meetings have taken place—

Niagara system	155
Eastern system	14
C. O. S.	20
Northern systems	100
	289

At about 50 per cent of these meetings committees were elected to carry on the work in the section covered by the meeting, including the making of the canvass for contracts; this has been the practice of the commission for some time, the endeavors of the committees being directed by the engineer for the district, keeping their efforts concentrated to a definite route, to a distribution centre, which in most cases is an urban municipality now being served.

The basis of former estimates submitted on the receipt of a petition was the petition, with an application of ordinary horse sense. This was in many cases found to be a wrong assumption—I do not mean the application of the horse sense —but the petitions did not represent the amount of business that could be secured when a canvass was made for contracts it was found necessary to establish a minimum amount of business as a basis for rates, to work from or to. It was also found that the 3 h.p. contract (Class 3) was more popular than the 5 h.p. contract (Class 4 or 5), as the total annual cost was less, therefore for the primary portion of this annual first charge they were put on the same basis and the minimum business referred to was placed at 3 of either of these classes per mile, or their equivalent, as an average for the district.

Under the legislation of 1920, distribution is made in districts or zones regardless of the geographical lines of townships. Under this more economical method of distribution it is possible to develop a system, where it was not possible as a township system.

The results of the meetings and canvasses by committees with the assistance of district engineers has been about 3500 rural contracts since June 16th, 1921, a large percentage being contracts for farm services, the balance hamlet and suburban services. Below is a list of rural construction approved, for which the bonus has been approved. Canvasses in many prospective and existing systems are not yet complete, and are being carrried on by the local committees.

Construction is under way in quite a number of the districts approved, favorable fall weather permitting this. (It is the policy of the Commission to avoid as far as possible winter construction.) Expert labor is supplied to direct the construction and install the equipment.

Following is a list of rural systems and extensions under construction, or approved to contruct.

Shortage of poles in Old Ontario has forced the Commission to underground construction for rural service. In 1921 less than half of the poles required were secured in Ontario,

TABLE NO. III.

Rural Systems and Extensions under Construction, or Approved to Construct.

Systems	Rural Power District	Consumers	Miles of Line	Load-K.W.
Niagara..............	13	1198	168-35	2050.5
Eugenia	[illegible]	22	3 16	23.5
Severn	1	60	7.6	85 5
St. Lawrence	3	88	15.25	131.5
Wasdell	2	4	1.6	14
Ottawa	1	76	18 61	194.5
	23	1448	214.57	2499.5

Rural Power Systems and Extensions Approved for Construction and Bonus Approved.

System	Townships	Consumers	Miles of Primary	Trans. Capacity K.W.	Total Estimated Cost	Bonus
Niagara	13	1094	173	1995		
Ottawa.	1	78	18.61	204		
Eugenia...	4	46	8 85	83		
Severn	1	99	17.75	158		
St.Lawrence	3	80	15 25	123		
Wasdells	1	4	1.58	14		
	24	1401	235 04	2577	$506,020.06	$146,867.16
Additional Capital applied for—					$ 75,479.44	$ 22,473 98

the balance coming from Quebec, New Brunswick and British Columbia. This is largely the cause of a great difference in cost of material for a standard rural 3 phase mile of line, on poles, the range being from $383.52, for material only, in 1911, to $843.94 in 1921 approximately 50 per cent of the cost of material per mile this year is for poles laid down

The Commission have laid out and have under way underground construction in the following township—

Salt Fleet	55 miles
Beverley	3½ miles
Ancaster	7 miles
Niagara	3½ miles
Willoughby and Bertie	8 miles

part of this being three phase and part single phase, taking in all about 115 miles of cable. The cable is lead encased rubber insulated with stranded copper conductor. A trench is made, using plows, with a minimum depth of 12 inches. The cable is laid in without a duct, the fill being made by using a scraper. The Commission, appreciating that load density is low, and construction must be under way in many districts at the same time, has endeavored as far as possible to use equipment which can be secured locally thus decreasing the cost. Farmers in the vicinity of the roads along which lines will be built, are assisting in the work, and are being paid at the current wage of the district; foremen, linemen and wiremen are brought in. It is possible methods of installation may be changed as the work progresses. The obstructions that are met with in districts are tree roots, boulders, and soil conditions. It would seem, from progress reports, and estimates, that 3 phase line underground will cost more than a similar line overhead, that single phase line underground will cost less than a similar line overhead,

TABLE NO. IV.

TABULATION OF SOME ACTUAL FIGURES ON RURAL SERVICE.

The following series of tables are compiled from data taken in Brock Township, Ontario County, and are for the purpose of illustrating comparatively what can be accomplished in any rural community.

Table Showing Comparative Data on Installation For Rural Electric Service

Farm No.	I	II	III	IV	V	VI	VII	VIII	IX
House Wiring									
No. of Outlets..	18	23	21	29	12	41	26	28	20
Cost of Wiring.	$100.00	$190.00	$100.00	$115.00	$100.00	$130.00	$ 75.00	$100 00	$ 75.00
Cost of Fixtures	$ 10.00	$ 75.00	$ 80.00	$ 18 00	—	—	—	—	—
Barn Wiring									
No. of Outlets	17	22	16	17	13	20	16	15	11
Motor...........	1	1	1	1	1	1	1	1	1
Cost of Wiring............	$151 50	$150.00	$170 00	$158.73	$138.00	$200 00	$175.00	$166.00	$145 00
Motor Installation									
Sizes in H.P.	5	8	5	5	5	5½	5	5	5½
Cost...	$148.50	$378.00	$165.00	$149.50	$176.00	$220.00	$165.00	$155.00	$235.00
Line to Road									
Length in Rods...	18	20	255	36	60	24	60	49	24
Poles included	—	—	—	—	-	—	2	—	
Cost of line	$ 30.00	$ 50.00	$119.34	$ 63.45	$265 00	$ 49.56	$100.07	$ 53.87	$ 54.34
Total Cost.	$440.00	$843.00	$634.34	$504.76	$679 00	$599.56	$515.07	$474.87	$509.34

TABLE NO. V.

TABLE SHOWING COMPARATIVE OPERATING DATA ON RURAL ELECTRIC SERVICE

Farm No.	I	II	III	IV	V	VI	VII	VIII	IX
Rates									
Annual Service..........	$60	$60	$36	$36	$60	$60	$60	$60	$36
1st Meter Rate	7c.	7c.	7c	7c.	7c.	7c.	7c.	7c.	7c.
Annual K.W.H.					¼ yr.				
In lighting	130	946	295	387	88	1138	434	604	276
In power.	284	1219	702	347	119	681	398	514	278
Work Done									
Bu. chopping	1000	5000	3000	1500	175	4000	3000	2400	1500
Root pulping	1200	35 Hrs.	—	3000	700	3000	500	3000	4500
Hrs. Milking	90	150	—	—	—	—	—	—	—
Separating	yes	yes	yes		—	—	—	—	—
Pumping	yes	yes	—	yes	—	yes	—	175 hrs.	400 hrs.
Feed Cutt'g	—	yes	yes		15 hrs.	60 hrs.	30 hrs.	20 hrs.	—
Total Cost	$85.12	$196.10	$95.15	$79.45	$26 48	$151.07	$110.57	$126.49	$73.78

[illegible] system with one-third three phase and two-thirds single phase underground, the cost of underground distribution would probably be lower than overhead. Most services from this system are overhead, transformers erected on a short pole at a suitable location for the service, or services and "run-offs" made to point of delivery to the premises.

This paper would not be complete without some reference to electric service in rural districts from other sources. The individual plant driven by gasoline engine with or without storage battery, is commonly known in Ontario, some having been installed for 9 years. These serve for lighting only; other uses, as a rule are a serious tax on most of these plants, and only result in impairing it for its most important use—lighting. By reason of the high depreciation of plant and battery, and the maintenance, the cost of service per unit of work or of electricity is quite high. Recently a pamphlet on wind-produced electric power—not the "hot-air" kind commonly used—but a plant driven by a windmill, came to our notice. It is manufactured in one of the Western states, costs $850.00 f.o.b. factory, has a capacity of 1.5 kw., and they claim in that State would generate and store 1013 kw.h. in the year. From our experience, the Class 3 consumer uses an average of less than 500 kw.h. per year. This amount of electricity in the average district as served by us, including all charges, would cost an average of 17.1 cents per kw.h., and if supplied by wind service, would cost 55.7 cents per kw.h. Rankin and others give data which show costs per h.p.h., 3½ to 15 cents, the latter cost being for 8½ ft. mills, the size commonly used. Individual plant users in each district are almost invariably the first to sign for Hydro-electric power.

The farmer as a user is usually more liberal in his uses, has a larger installation and more possible uses than urban customers. The appended list of installations, cost of installation, annual uses, annual cost and work done are included as a part of the paper for your use as a reference if interested.

Syndicates have been formed in different parts of the province, whereby a number of farmers form to acquire, own and operate a large motor and outfit for doing their heavier work. These have been a success from their point of view, and when operated on a system which is not too small, would be a benefit to the system by reason of the increased uses, if there be a sufficient number served by the syndicate. In this we again come to the principle which must be kept in mind when considering rural services, viz.:—"Make the maximum use of the service when it is installed, and keep the peak low.—Good load factor."

From the manufacturers and distributors' viewpoint the rural business is no less a problem than from ours. The residents in rural districts from time immemorial have been the butt of the "gold brick salesman". So be careful at the start, and we believe the field now open for business will enlarge greatly. The business is there but the rural resident is rather "gun-shy" of the city and large town salesmen; gain their confidence by sensible dealings, "don't advise them to use vacuum cleaners for the cows in cases where the stables need attention." Local men in most cases can secure the business better than outsiders, and have the advantage of knowing the people, their faults and their virtues.

In conclusion, as the preacher says, the slogan "Do it Electrically" can now be applied in the country as well as in town, and the Hydro principle of "Co-operation" should be specially emphasized in approaching and dealing with farmers as a class. The Commission will be pleased if you can help us in getting information to people in your several districts adjacent to the urban municipalities you represent, we for our part will endeavor to supply you from time to time [illegible] information as we can.

Dominion Engineering Agency, Ltd.

The Dominion Engineering Agency, Ltd., has just been formed with head office at 24 Adelaide St. E., Toronto, with Mr. Daniel M. Fraser as president. In the meantime they are operating as manufacturers' agents but eventually, we are advised, they will handle anything of an engineering nature. The firms represented include the Cutter Electrical & Mfg. Company, Philadelphia, (Eastern Canada); Schweitzer & Conrad, Inc., Chicago, (Ontario) and the Ferguson Manufacturing Co., London, Ont., (Eastern Canada). The first named comvany manufactures the well known type of circuit breakers; the second company specializes in high tension equipment, and the London firm manufacture Conduit Pipe fittings. A further line soon to be added is the "Fraser" patent attachment plug cap, an invention of the president of the company, which will be placed on the market in the near future.

Mr. D. M. Fraser

Mr. Fraser is very well known in electrical circles as estimating engineer and superintendent of construction for a number of years with the Canadian General Electric Company. He was born and educated in Scotland and came to Canada in 1910. For a time he was with the Montreal Light, Heat & Power Company and later with Mines Power, Ltd., Cobalt, (now the Northern Ontario Power Company). Before joining the C. G. E. staff he also spent some 18 months on general electrical work. He is a member of the Engineering Institute of Canada and a fellow of the American Institute of Electrical Engineers. During the 1919-20 session Mr. Fraser was secretary of the Toronto Section of the A. I. E. E.

The Delta-Star Electric Co., Chicago, Ill., are distributing bulletin 32, describing a complete line of outdoor high tension switching and protective equipment, of Unit Type design. A copy will be sent on request.

Descriptive leaflet 3443 issued by the Westinghouse Electric & Manufacturing Company describes its new luminous top holder socket reflector. These reflectors have several advantages, such as simplicity, easy to wire, mechanical strength and complete interchangeability of parts.

The Wheaton Electric Co., 318 Donald St., Winnipeg, has been awarded the electrical contract on a store building recently erected at Rosedale & Cockburn Sts., Winnipeg, for Mr. A. T. Menzies, 381 Roseberry St., St. James, Man.

The Electrical Contractor

Is The Contractor a Merchant?

Occupations of Contractor and Dealer as Distinct as Those of Blacksmith and Doctor

In our Jan. 1 issue appeared an intesesting discussion on the question of whether a contractor-dealer is a possible combination or whether it is not better for the contractor to stick to his business and the merchandiser the same. The idea is gaining ground that it requires a different type of man to make a success of these two activities. A contractor reader has just taken the trouble to call up the editor to emphasize his own viewpoint in the matter. This contractor at one time had the idea of building up a merchandising business, but soon found that he was losing his grip on contracting without getting a corresponding hold on merchandising. He was wise enough to give up the idea of being a merchant and has concentrated on contracting, not forgetting, of course, to place an occasional appliance with a customer whose premises he may have wired; but he makes no attempt to "keep store" and has no sales organization.

A thorough discussion of these matters seems to be the only way to get at the facts. Below we reproduce another excellent viewpoint—an article published in the "Electrical Record" for December. We should be glad to have our readers add their own viewpoint to the discussion:

A good deal has been said and written as to whether the electrical contractor should or should not also be a dealer in electrical appliances.

This question is easlly answered in the case of the contractor-dealer who is successful; of course this type of contractor should also be a dealer, because he has proved that he is on the right track. And it is just as easily answered in the case of the contractor-dealer who has not met with success; there can be no question but what he should not continue in the joint business of contracting and merchandising, for the opposite reason, namely, that he is not making money.

All this would be quite simple were it not for the fact that it is also necessary to know in determining this question, whether the success or failure of the contractor-dealer is due to his aptitude or inaptitude in handling the contracting or the merchandising part of his business.

An investigation of such business, whether successful or unsuccessful, would soon indicate which part of the business was receiving the most expert attention. If the contracting end of the business was being better looked after due to the proprietor's knowledge of contracting, and the merchandising end was left to more or less shift for itself, and the business was successful, then one of two things is evident; either some of the good profits of the contracting business are making up for the unprofitable merchandising or there are sufficient profits in the merchandising end of the business so that it pays without close and expert supervision. In either event there isn't much to worry about as the business is successful and the creditors are being paid and the bank balance is growing—and everybody is happy.

The Unsuccessful Business

In the case of the unsuccessful business, however, such an investigation, while revealing the fitness of the proprietor for contracting or merchandising, tells a different story; the business is not successful. Is it because of the contracting or because of the merchandising or because of both not being properly handled? If the last named is the case then there is no hope; the contractor-dealer should connect with someone else in business to whom he might render successful service and receive satisfactory compensation until he can find his weaknesses and overcome them either as a contractor or as a dealer rather than buck the tide of business before he is ready. If his failure is due to lack of knowledge of merchandising it is plain that he should drop this part of his business and stick to contracting only, or if his knowledge runs to merchandising and he knows little or nothing of the practical side of contracting then he had better let that part of his business go and attend to merchandising exclusively, because therein lies his best opportunity.

The human mind runs along certain channels; it has a tendency to perform a certain kind of work and to shirk another. That is why we have good doctors who like their work and are fitted for it and meet with success, and poor doctors who might have made good lawyers or carpenters.

The occupations as represented by the contractor and by the dealer are about as distinct and as far apart as those of the blacksmith and the doctor. There is no saying that a man can't be a blacksmith first and then decide to be a doctor and after going through the prescribed course not be a good doctor; but it will readily follow that if he is a good doctor he will no longer be a blacksmith, also that if it turns out that he is not a good doctor that he may return to his smithy at which he was proficient enough to earn a livelihood. It is safe to say, however, that he will not practice his trade as smithy and profession as doctor at the same time.

While the comparison may be far-fetched it is used to illustrate the point that the mind which runs to contracting runs away from merchandising and the merchandising mind acts likewise.

Exceptions Only Prove the Rule

It is true that cases will be found where one takes to both, but such cases, either mediocre successes or the rare geniuses, are so few that they are but the exceptions which prove the rule.

Therefore, it would seem that from the mental angle a clear distinction exists between the contractor type of mind and that of the dealer, and the contractor-dealer can determine by self analysis which direction he should take.

The mental angle, however, is not the only one to consider. We have also the financial burden to think of.

The contractor has his investment in material and labor and expense, and as a rule this outlay is heavy enough to keep him "humping" to meet his obligations as they mature. This is enough to keep him from adding on side lines that call for more money, the providing of which keeps him constantly in hot water and prevents him from functioning as he should in the conduct of his original business.

The same applies to the dealer. He has all he can do to have enough money on hand to meet his obligations for merchandise and selling and administrative expenses without [illegible] the additional burden of employing a construction crew on work with which he is not thoroughly familiar.

Granted, however, that the financial condition of either a contractor or dealer is such as to permit of expansion and it appears in the case of the contractor that the taking on of merchandising or in the case of the dealer the adding of a contracting business would utilize this idle capital to advantage, in most cases a thorough investigation will undoubtedly reveal it will be more sound to extend the business already operating than to branch out into another more or less unknown field.

The Only Way to do Both

The exception to this rule will be found in that type of individual, who, having made a success in one line of business, organizes his business, places a capable individual at the head of his original business as well as another at the head of the new department, and then devotes his own time to supervising both, to the end that each pays its way.

When a man gets beyond the one-man stage it does not go into a two-man class, but rather skips that and takes the three-man organization. It begins to pyramid, and as in the case of the geometric figure of a pyramid the base is wider than the top; so in a business organization when pyramiding begins the base must widen to withstand the super-structure's weight.

In addition to the executive type of mind there is also required a mind that lends itself to the field of accounting, because while a one-man business can be kept "under one's hat," a business organization must have records that always completely tell the story of "whither art thou going" and at what pace, or the rocks may loom ahead.

The Public Point of View

So much for the contractor-dealer question from the inside angle. Now, from the outside point of view—from that source which controls business, which really determines whether it shall be a success or failure: The buying public.

If in a given community there is a contractor who has added a small display of merchandise to help meet the expense of operating his contracting business, and in this same community there is a dealer who has a larger display of merchandise and does a little contracting on the side: enter the buying public. Which can give the better service. The **contractor**-dealer who is long on contracting and short on merchandise, or the **dealer**-contractor who is long on merchandise, but short on construction work? The answer is evident: If the public wants construction work it will be better served by patronizing the **contractor**-dealer, and if it wants merchandise then the **dealer**-contractor can render better service. The **contractor**-dealer has forgotten more about the requirements of construction work than the **dealer**-contractor will ever learn—it's his business to know it; and the **dealer**-contractor having a larger and more complete line of merchandise, more up-to-date, paying more attention to this business can render better service in that direction than the other.

Therefore, if the public wants the best service in both requirements it had better patronize the contractor for its construction work and the dealer for its merchandise.

It follows then, that if the public is to best served, the contractor, in adding a merchandising business to which he can't give the same expert attention as he does to the contracting, of which he has made a success, can't properly serve the public and has only added an overhead burden for his pains. It is the same in the case of the dealer, who, if he maintains the proper records, will soon discover that in place of the revenue from contracting which he expected he will be taking some of the merchandising profit to offset the new departure's loss.

The Conclusion

And so the answer follows: where the community can support both contractor and dealer, let each confine his entire efforts to his own business which he knows well and which, by concentration, he can learn to know better.

Thoughtless and destructive competition which is bound to result where everybody is endeavoring to do somebody else's business, thereby neglecting his own, never served anyone well. Thoughtful and constructive co-operation, on the other hand, has given us all we have to-day and shall continue to be of the greatest service and benefit to all mankind in the time to come.

The Wiggett Electric Co.

The Wiggett Electric Co., Ltd., of Sherbrooke, Que., incorporated under the laws of the Province of Quebec, have taken over the business of the Electric Repair & Supply Co. They have erected a new building, thoroughly up-to date, at a cost of $20,000. This is a 3-storey building which will enable the company to carry on, in all its phases, a thoroughly modern electrical contracting and repair business. One section of the building is set aside for motor repairing and another for general electrical repairs, both of which are well equipped with all the latest machinery. The president of the company is Mr. W. J. Wiggett; vice-president, George Pearson; director, N. L. Wiggett. The company reports that business has been good and is to-day surprisingly good for this time of the year.

Have Opened Electrical Department

The Cross & Sutherland Hardware Company, Ltd., Hanover, Ont., with a branch store at Durham, have recently established an electrical contracting and electrical merchandising department and are carrying an up-to-date line of electrical appliances and fixtures. Their contracting department has just been awarded the contract for reconstructing the electrical service and adding an additional 40 h.p. motor to J. Metzgar's grist mill at Neustadt.

Short Course in Testing

"A short course in electrical testing," in its fourth edition, is published by the D. Van Nostrand Company of New York. It is written by J. H. Morecroft, E.E., B.S., and F. W. Hehre, E.E. This book covers the course at Columbia University designed for students in mining, mechanical, metallurgical, chemical and civil engineering whose courses do not include the theory of electrical machines but who, of necessity, come in contact with them and utilize them. It has thus been the intention of the authors to present the subject matter in such a manner that the student not well versed in theory can get the most out of his course in the shortest possible time. In the fourth edition certain experiments have been added on batteries, illumination, measurement of electrical energy, etc., with the idea that the non-electrical engineer who frequently has to pass judgment on these phases of electrical installation should have a general knowledge of these features of electrical engineering. 220 pages, well illustrated; green cloth cover; size, 6 in. x 9 in.; price $3.00.

The Swedish General Electric Co., Toronto has been awarded the contract for supplying the city of Winnipeg with exciter generators. The contract amounts to approximately $23,000.

Hamilton Memorial Arts Building Equipped Electrically Throughout

The Hamilton Memorial Arts Building has just recently been completed, and contains much that is of interest to the electrical contractor. The building is situated in the school grounds adjoining the large 28 roomed Memorial Public School.

Deputations from all over Canada, and from the United States and Australia have visited these buildings and have pronounced them to be the most modern and complete of their type ever inspected.

The buildings are entirely fireproof construction throughout, with fireproof stairways towers. Large window area is provided to obtain the maximum amount of daylight in the classrooms.

A complete system of artificial lighting is provided as shown in the photographs. The wiring throughout is installed in concealed conduit work. The lighting and heating (cooking) circuits are entirely separate. The service supplying the building is installed underground. This service is connected to the switchboard in the sub-station of the main building.

The electric heating system is controlled by a special Krantz panel located in the household science director's private office. Thus, no person is permitted to use any of the electric heating or household science apparatus without permission from the director. Further, it prevents any of the apparatus being left connected, as the director can pull the main switch on this panel and disconnect all outlets.

This panel is provided with double doors to make it dead front and prevent unauthorized persons from tampering with the fuses. The doors are provided with locks and keys. All conduits leading to this panel are concealed.

The household Science Department consists of a bedroom, dining-room, kitchen, laundry and pantry fully equipped. The kitchen is equipped with an electric range. The laundry is equipped with electric irons, and ironing boards, washing machine and a clothes dryer. Stationary tubs complete the equipment of this very important department.

The Domestic Science and Cooking Department is on the second floor. By referring to the illustration, you will note how completely this room is equipped. Each student has a combination gas and electric hotplate with stool and cupboard. These hotplates were manufactured specially for this installation. Each student is provided with a towel rack at the rear of the table, as shown in the picture.

The students are assembled in a square. At each corner of the square is a special table, mounted on casters, which is used similar to a serving table or dinner wagon. A large size range is shown in the corner of the room. With the combination gas and electric stoves the students can be instructed in the use of the two types of equipment.

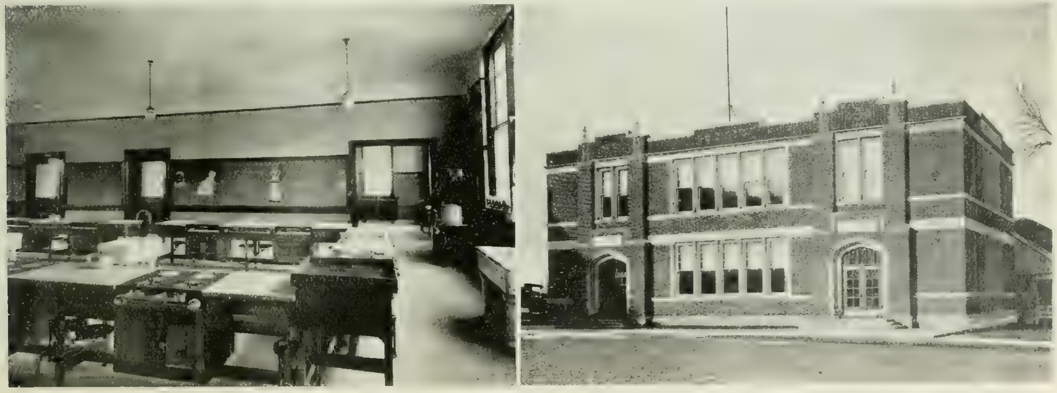
It is needless to say that the students have shown a strong preference of the electric appliances owing to their cleanliness and convenience and there are no fumes.

The wiring for the hotplates is all mounted under the tables connected to waterproof floor boxes, as the floor is terrazzo in order that it can be washed. Artificial lighting has been provided for night classes, if required.

The Manual Training Department is very complete for the teaching of this art. Wiring has been provided for motor driven wood working tools which are to be installed later. This wiring is all concealed in the floor, with waterproof boxes, and will provide means of connecting to each motor on each machine.

The control for these motors is provided by enclosed motor switch mounted concealed in the wall. The tables are constructed of steel and each student has a very complete supply of tools. The lighting is provided by Benjamin R. L. M. Industial type units. Each student is provided with a steel locker for his apparatus. A storeroom for lumber, paints and varnishes is provided. All painting is done in a separate room. With the equipment used in this school the children should receive a very complete training before passing on to the collegiate and university. The building is located in the section of the city which is inhabited by the middle class of people who are employed in the large number of industries in this section of the city.

Culley & Breay installed the electrical equipment in this building. Mr. Gordon Hutton, Bank of Hamilton Building, was the architect. The complete electrical installation was designed and supervised by V. K. Stalford, consulting electrical engineer, Sun Life Building, Hamilton.



Hamilton Memorial Arts Building—View of Domestic Science and Cooking room to left

BETTER MERCHANDISING

A Golden Opportunity

Study the picture on the opposite page.

A wonderful airplane view of the Chippawa-Queenston development, you say.

Yes, it is, but it also means much more than that.

It represents the Ontario electrical industry's **opportunity**—the finest opportunity the province has ever had—the finest opportunity any province ever could have—ample electric power for years to some.

What opportunity and whose, you ask?

1. To the citizens at large, comfort, convenience, leisure, health—a distinctly higher plane of living.
2. To the contractor who equips the home—profitable business.
3. To the merchant who sells appliances—profitable business.
4. To the wholesaler who stands behind the contractor and merchant—profitable business.
5. To the manufacturer behind the wholesaler—profitable business.

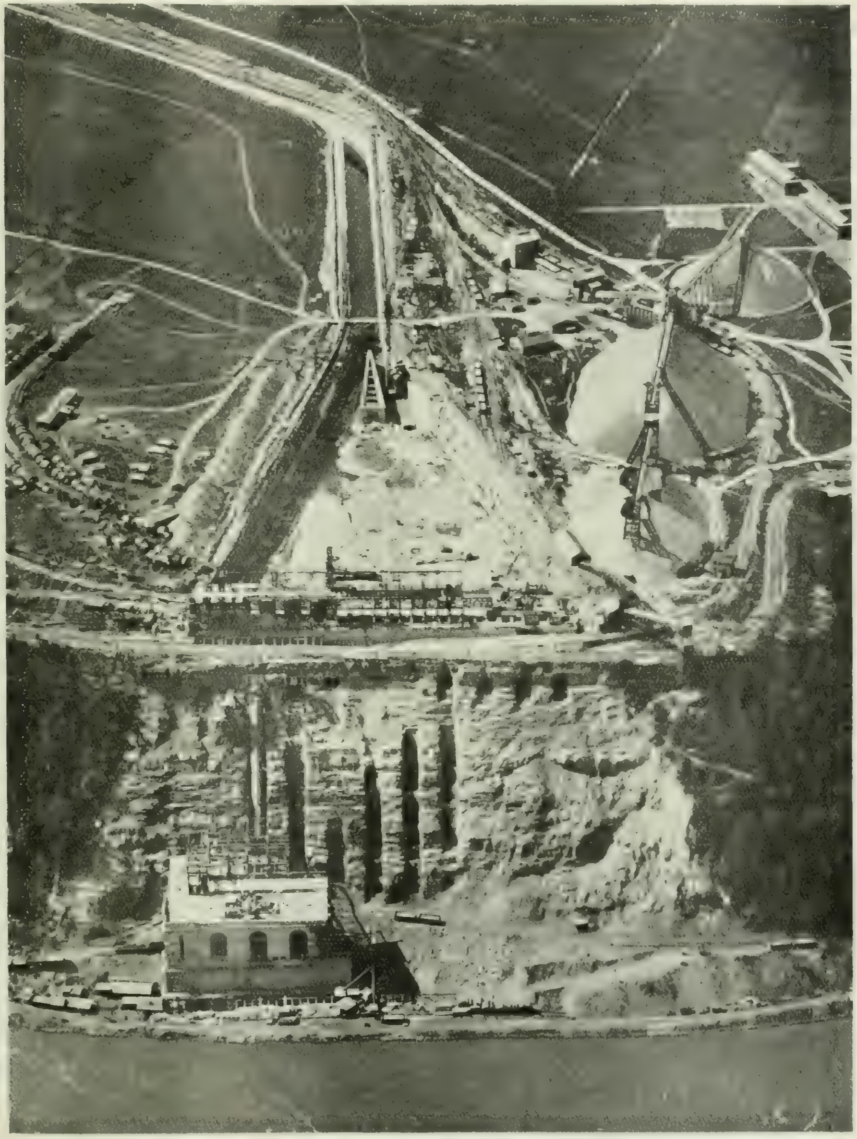
Think of the magnitude of the opportunity—50,000 h.p. available today; 500,000 h.p. just as soon as we can take it!

Our duty today and tomorrow, and for many days to come, seems perfectly clear. Everything depends on the attitude of mind of the men and women in our homes. If the viewpoint is "We want electric homes" there is no force that can stand against it. They will come and demand electrical appliances just as they now demand shoes and hats—but with greater enthusiasm.

Isn't it our plain duty to concentrate our efforts, to coordinate our efforts, to the sole end that men and women throughout the length and breadth of Canada shall rise in a body and

DEMAND ELECTRIC HOMES

Airplane View of World's Largest Power Scheme



A wonderfully realistic Bird's-eye view of the Chippawa-Queenston development of the Hydro-Electric Power Commission of Ontario showing Canal, diffuser, forebay, gatehouse, penstocks, powerhouse and Niagara River.

Electrical Leagues and Associations

Organizations Throughout Canada Doing Useful Work in Endeavor to Revive Trade and Improve Merchandizing Conditions

Mr. Rey E. Chatfield, secretary-manager of the Electrical Service League of British Columbia, is starting the year right with a vigorous campaign among the contractors and dealers of the province to improve their methods of doing business and increase their turnover by following the lead of older established lines of trade who, through many years of experience, have become more expert and exact in the science of merchandising than has been possible in the few short years during which the electrical industry has been a factor in the industrial world. Mr. Chatfield has sent out some very helpful letters to the League membership. Two of these have come to our attention and we believe that in passing them along to the contractor-dealers in other parts of Canada we shall be doing a real service to our readers. Here they are:—

I—VISUALIZE YOUR JOB

The story of the three stone cutters leaves nothing of wisdom to be said. They were working on a stone. A stranger asked the first what he was doing. "I'm working for $7.50 a day," he replied. "And you?" the stranger asked the second. "I'm cutting this stone", growled the laborer. Then the question was put to the third stone cutter. He answered, "I'm building a cathedral." The Christian Register.

At the end of the old year, Mr. Contractor-dealer, it is necessary to summarize the effort of your business for the past year. The facts may not be pleasant as shown by the yearly statement but how do you visualize your job? Are you working for seven dollars and a half a day, are you making wiring installations or are you **building a business** on a sound foundation?

If you are working for a daily wage; resolve to take more pride in the growth of your business: if you have faith in your business the public will have faith in you.

If you are merely selling wiring installations decide now to build a better business by rendering a real service to your customers.

If your are building a business, face the facts; during the year you have done a certain volume of business; the expense of operation has been a certain amount, which bears a definite relation to the volume of business which can readily be translated into a percentage figure. Use this figure in pricing jobs or merchandise and resolve to take no work at less; **then adhere to your decision.**

If you can do no better than make wages; why continue to tie up your capital in order that you make wages, far better would it be that you discontinue business and work for some one else.

Do your books show you an exact cross section of the condition of your business? If you are not sure of this, let the Service League help you decide this matter by assisting you to read the facts.

These are straight unvarnished facts that must be faced at this time of the year. Let's face them and decide upon a business policy that will bring renewed faith in our business. If we face the actual conditions and all work together for the betterment of the condition of the business 1922 will be a banner year for the electrical industry of British Columbia.

II—GOGETIT

A country simpleton—not so simple as he looked—was out to hunt for a lost cow that had been unavailingly searched for by the entire community. To the amazement of all a few minutes after he started out he returned, driving the cow. The astonished bystanders immediately wanted to know how he had found the "critter."

"Well, I just set down and thought of the place I would go if I was a cow", he explained, "and then I went there—and there she was!"

The way to find business to-day is to figure out where business is likely to be--- and **Gogetit** (Forbes).

The above story opens great possibilities for the Electrical Industry in British Columbia for the New Year. The field for use of labor-saving devices, better lighting, and electrical industrial devices has been scarcely touched in British Columbia. Do not sit in your office and wait for business to come to you. Look the situation over and sell yourself the idea that a particular device will save your "prospect" money, by cutting production costs or by speeding up work; then tackle him with the proposition that by the purchase and installation of a particular device he will save money. In times like the present a man looks twice at a dollar before he spends it. He must be convinced that he will get value received for his expenditure.

Sit down and think what you might sell your customers or others, which will be a profitable investment for them. Then **go get the business.**

The Service League can be of great assistance in helping you gather ammunition for the attack on the reluctant prospect.

The Service League can be of assistance through the field man in helping you with your accounting and merchandising problems.

Use the League.

Niagara Peninsula Contractors

The first regular meeting for 1922 of the Niagara Peninsula Branch of the Ontario Association of Electrical Contractors & Dealers held in the Chamber of Commerce rooms, St. Catharines, Ont., on Monday, January 9, was well attended by both members and outsiders. After the regular business had been disposed of, the chairman called on Mr. C. D. Henderson, of the Henderson Business Service, Brantford, Ont., to address the meeting.

Mr. Henderson chose as his subject, "Making the Business Pay," prefacing his address by congratulating the contractor-dealers on the co-operative spirit prevailing among members of the Association and their very evident desire to boost the electrical industry. He emphasized that making the business pay was the first fundamental for which we are all striving, some with success because they **know** what it costs to do business, others practically working for nothing because they **guess** at the costs and fail to correctly analyze them. The speaker outlined the items which constitute "Overhead" by means of five graphic charts showing the various estimated expenses for contractors with a $5,000 to $100,000 turnover per year. Members present were asked to criticize the various items constituting this expense but all were of the opinion that Mr. Henderson's figures were very conservative.

The Henderson Business Service, which has been developed to a remarkable degree by the energy and ability of Mr. C. D. Henderson himself, is one of the most valuable assets a contractor-dealer can have. The cost of this service may appear considerable to the man who does not realize its worth or who doesn't realize his own necessity, but we have yet to hear of the contractor-dealer who has made a study of Mr. Henderson's system and has not become a convert to its value. Contractor-dealers all over Canada are working hard, long hours, enthusiastically, and yet many of them are not making progress, simply because they are working in the dark, using wrong methods and overlooking essentials. To all such we urge a trial of the Henderson Business Service.

Kitchener Exhibit May 1—6

The cities of Kitchener and Waterloo, Ont., will stage an exhibit in Kitchener during the week of May 1 to 6, to be known as the Twin City Electrical Exhibition. At the last regular meeting of the municipal council of Kitchener a resolution was passed heartily endorsing the exhibit and adding the rider that "Owing to this city enjoying the distinction of being the birth place of the present vast Hydro-electric Commission operations, it seems that the choice of Kitchener for this exhibition will be most fitting and popular and receive the co-operation and support of our citizens and neighbors throughout Western Ontario."

Thermo Electric Ltd.

Thermo Electric Limited is the newest electrical manufacturing concern to locate in Brantford, Ontario. It is now manufacturing a number of water heating devices, notably the Thermo Electric single vent water heater. This heater is of the immersion type, requires no extra plumbing, and, it is claimed, no expensive wiring service. The heater is fully covered by patents and is approved by the H. E. P. C. It is being sold by the Northern Electric Company, Limited.

A Unique Invitation Card

The Manitoba Electrical Association has hit upon a unique idea for sending out the invitations to their regular weekly luncheons. The cut herewith illustrates the idea. The actual invitation form is 7 in. long. The announcement itself is made on the reverse side of the card.

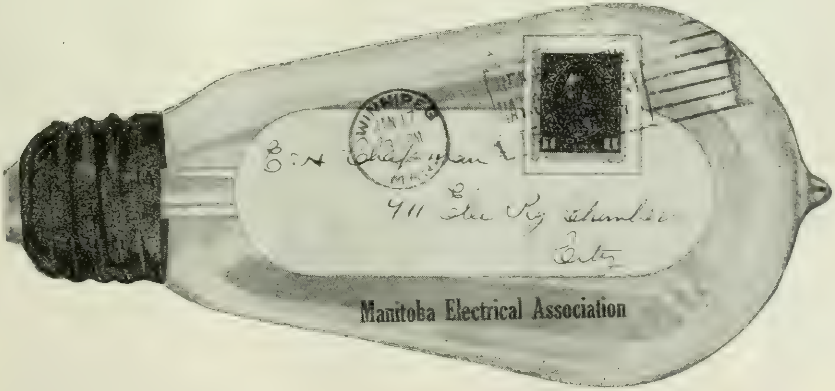
Appointed Eastern Canada Representative

Mr. R. A. L. Gray has just received word from the secretary of the National Association of Electrical Contractors that he has been appointed Eastern Canada representative on the executive committee of the association. This position was formerly held by Mr. Kenneth A. McIntyre, who resigned on the occasion of his associating himself with the Society for Electrical Development, in the capacity of Canadian representative. Mr. Gray is one of the best known contractor-dealers in the Dominion and is a representative of which the Canadian electrical industry has every reason to be proud.

Mr. R. A. L. Gray

The Russell-Fowler Co.

A new firm of manufacturers' agents have just opened up an office, at 306 Notre Dame Ave., Winnipeg, under the name of The Russell-Fowler Co. Both Mr. Harold Russell and Mr. Ray Fowler have had considerable experience in the electrical business, Mr. Russell having until recently been on the purchasing staff of the Great West Electric Co., Ltd., Winnipeg, and Mr. Fowler on the sales force of the same company. They have some good lines at the present time but are in the market for a few more. Mr. Fowler will be calling on the Western trade as far as the Pacific Coast, while Mr. Russell will take care of Winnipeg and east to Port Arthur.



Some Problems in the Industry

We May Not All Think Alike But We Are All Working Toward the Same Goal—Confidence in One Another the First Step

By W. B. DICKESON*

Our organization was instituted with certain ends in view and we as members are all aiming at the same mark. We have paid our fees and are all devoting more or less time to this association, so it is up to us to get our money's worth from it.

We are like ships on an open sea, bound for the same port and, as is often the case, steering our boats on somewhat different courses. It is only natural that each one of us thinks our particular course is the best one, but in so thinking it is better that we use our efforts to prove this than to criticise the other fellow for not aligning his boat along side ours for the entire course.

The idea of finding fault with the other fellow and forgetting our own interests in doing so seems to prevail to too great an extent among our members. Instead of using our club to bring the different dealers in our locality closer together, it seems to be, up to this time, driving us farther apart.

It is absolutely impossible for two individuals to think exactly the same regarding a common subject. We know that mechanics have their little hobbies as to their methods of finishing a piece of work which may be given to them. If one had to use another's tools, he would perhaps find fault as his own tools would be more familiar and easier for him to work with and therefore it would be quite natural for him to think that his were the best. At the same time another mechanic would be thinking exactly the same if he had to use someone else's tools.

It therefore goes to show that the same thing might prevail among merchants, or professional men for that matter. Now it has been proven in many instances through the formation of co-operative societies that these conditions can be overcome and the entire efforts centered on producing results which far exceed those of persons who find time to watch their competitors. Let us instead profit by what our friends are doing and work in harmony with them. If they should beat us in fair play, give them credit for it and take the incident as a lesson to ourselves.

You will notice, if you are a follower of athletic sports, that the coaches of different teams profit by the success of each other. Also the captain, if beaten, immediately collects the players and first of all they give three rousing cheers for the winners. What a fine spirit to exhibit among competitors in business.

It may be that your humble servant has not been making himself as plain as he would like to, but you will perhaps see from these comparisons what he is aiming at.

Work in Harmony

Now we have launched out on a co-operative advertising scheme which is undoubtedly a step in the right direction. However, as it appears to me, the most important thing for us to accomplish at this time is a more united effort, working in closer harmony to the end that our line of business be accepted by the public on a higher plane than it has been in the past.

While it is farthest from our thoughts to establish any definite scale of prices for our merchandise, it would be remembered that in making a sale, we offer not only our goods, but also the best possible service that we can give, charging a fair margin of profit for ourselves, at the same time giving our customers one hundred cents worth of value for every dollar they spend.

It does not require any sales ability to merely sell goods, but it does require considerable of it to make a sale and have yourself and your customer thoroughly satisfied in every way with the transaction.

Pooling the Problems

If we as members of this Association can form a pool, and bring the different questions that confront us before our meetings for discussion, they will eventually be of profit to us inasmuch as we will know just how to grapple with them the next time they appear. You may have one that baffles you and another member may have already solved it. Why not thresh our problems out together? All the time you are getting better acquainted and to your surprise you find that your competitors are not such bad fellows after all. You know we all have some good points to our character, but as long as we stay apart and judge at long distance, we fail to discover any redeeming features. We think that because one of us has occasion to attempt anything other than the regular that he is trying to take some advantage and we do not allow ourselves to look upon it in any other light. It is just possible that if any other member found it convenient to attempt something of the same character that it would cause him to view the situation from an entirely different angle and form different conclusions.

I would therefore suggest that broad consideration be given these difficulties before any action is taken. Snap judgment on any matter is a poor policy and often leads to complications that otherwise could be avoided.

There is one condition however, that confronts us all and one which is worthy of generous consideration, and a recommendation to headquarters, backed by decisive action on our part, might work out for good.

Resale Prices

This is the policy of many manufacturers of setting a resale price on their product which in some cases does not allow a merchant a reasonable profit. They get their own price for what they make and then advertise their article to the public at a certain price, forcing the dealer to handle the goods without any say as to either cost or selling price. They do not know anything about the cost of the dealer's operating expense nor how much it is necessary for him to add to the cost of an article to insure him a profit, yet they take it upon themselves to set that sale price for him. They wouldn't allow anyone not connected with their own enterprise to figure out these details for them, so why should we be obliged to let them do it for us.

The method of marketing electric fans is a glaring instance of the above. There isn't any doubt in the minds of the average dealer or consumer that the price of fans is entirely adequate to take care of the expense of manufacture and profits for those who handle them, but I am sure that there is not a dealer in the country who has ever made a real profit from the sale of fans.

There are other devices and appliances which might be mentioned here if time and space would permit, but it is the

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[illegible] Ontario Association [illegible] principle which is bad and I think we should aim to have it rectified.

One Thing at a Time

I have endeavored in a crude manner perhaps to bring before you one or two ideas that are worth the time it will take to discuss them and try and have concerted action taken that may lead to a betterment of conditions. There are others but it would be well, I think, to apply ourselves to certain definite aims until they are disposed of.

In conclusion I would like to suggest the inadvisability of attempting anything in the way of reform until we have arrived at that stage where we can depend upon each other. If something occurs that makes it appear that one member is not inclined to play fair with the rest, the proper place to discuss it is at a meeting of the Association and not take the matter in hand as an individual. We might just as well not be organized if we are going to deal with problems singly. The whole scheme thus becomes a loss—lost effort, lost time and lost money. We are trying to overcome all these and make our vocation a profitable one for ourselves and our patrons.

Let us therefore unite as far as is possible and work to that end in a fair and honorable way, laying our cards upon the table so that each may see the other's hand. We will thus be off to a start to accomplish things. Otherwise our efforts are sure to fail.

Some Suggestions for Better Lighting

By J. T. SCOTT
Sunbeam Lamp Division, C. G. E. Co

Try to imagine the old time office and work shop lighted by candle and oil lamps. That poor condition exists to-day in many offices and shops by reason of the improper use of quantity, quality and distribution of light.

It seems as if the eyes, because they never complain by an epidemic form of sickness, are to be unremittingly abused. A wise health department sees that conditions are proper for the maintenance of general health. In schools the eyes of children are sometimes examined and partially cared for. In industrial plants the optometrist visits and prescribes the glasses required where necessary. The evil is acknowledged. But what about the cause? No public department watches over man's need here. Indeed it would be difficult to expect anything to be enacted, beyond the setting of a standard minimum of lighting to be maintained where operatives are engaged. Much more than this is needed however, varying according to the particular demand. What this actual demand is, will be better understood in the course of time, and after sufficient educational work has been done to assist people towards making an intelligent interpretation of their needs. At the moment there are very few who know whether they require an intensity of light equalling 5 or 10 foot-candles, and many struggle to perform their work by an insufficiency of light that does not measure up to one or two foot candles

It is the purpose here to indicate briefly the importance of an adequacy of light and to aid a recognition of plants which fall short of requirements in illumination.

The aim is more work, of better quality, and with less effort.

Poor vision, made worse by poor lighting, must mean either spoiled work or a longer time to do the job, both of which signify loss of time and money. The efficiency of expensive machinery is impaired also because of poorly placed light or not enough of it.

Good lighting is rather a matter of common sense than special engineering knowledge. Personal judgment is sufficient in most cases, but it must be good judgment based upon some knowledge of a common measure.

Not a matter of cost

The purchases of goods is not made without reference to a measure of quantity. The stores are issued in the plant by similar standards. Then why equip the lamp sockets without a full idea of the quantity of light to issue? The cost does not end with the price of the lamps and the current consumed. It is not a matter of watts; they are cheap enough relatively; it is a question of sufficient foot-candles, lumens or intensity of light, having regard to the work to be performed. The illuminating engineer would here determine the amount of light distributed by use of the foot-candle meter, but where that handy instrument is not available to you, use the sense of sight as a guide to what is necessary. Cut out as much shadow as possible, reduce any glare by proper shading or by using frosted lamps, and avoid reflection from bright surfaces. Guard against the dim, eye-straining light that is usually mistaken for "soft light". Remember,—do not cut down the light, but shade it and keep the direct rays from the eyes. Unshaded light sources are far too prevalent.

A worker after gazing into an unshielded light may be injured by moving machinery as a result of temporary blindness due to after-images; deep shadows resulting from the same cause increase the possibilities of danger. These few facts have been often pointed out. They are worth repeating because a walk through some plants, and by some stores, shows the necessity for repetition. Dim lights are covered by dust laden shades, bright glaring lights are left unshaded—some hung so low as to be right in the line of vision, others hung so high as to give faulty distribution, and casting weird shadows. If the owner of these various sorry schemes could be compelled to a ten minute silence while they considered the violation to the intelligence of it all,—something might be done towards a betterment of lighting.

Plays the More Important Part

Do not forget that light plays a far more important part than it usually gets credit for.

The correct lamp with its output of lumens equalling the required intensity of light distribution, is as necessary and important as is the correct motor for a particular load in the mill.

First determine how much illumination will be required. This of course will depend upon the purpose for which the light is used. Work requiring close attention will need a higher intensity of illumination than work of a courser grade For instance, the machine shop will require good illumination of from 10 to 16 foot-candles as against the 5 to 6 foot-candles sufficient for the foundry, and a matter of 2 foot-candles for stairways and passageways.

The fundamental requirements of any installation are;—sufficient light on all parts of the working area and freedom from glare and reflection.

Help to make the store more pleasing, and get the factory made safe, cheerful and more productive by better lighting.

This also has its commercial side. Let the electrical dealer and salesman bear in mind the several phases outlined above, and use them in rendering service to the customer, and by suggestion, in trying to effect sales. Overcome the indifference and negligence and keep up with the wheels of progress.

Organized Advertising Brought Results

Under the auspices of the Electrical Service League, the electrical industry of British Columbia conducted an intensive campaign for Christmas trade which lasted about six weeks. Beginning the first week in November, cards showing the cost of the principle electrical appliances, in common usage, were displayed in the shop-windows of all contractor-dealers' stores. This was followed by a so-called "advertising merchandising schedule" for a period from Nov. 30 to Dec. 15, when the window displays and newspaper advertising of the dealers was correlated. Beginning Nov. 17 and extending to Dec. 23, newspaper advertisements appeared in the British Columbia daily newspapers. These appeared for three days in the Vancouver papers, for four days in the New Westminster daily, and for three days in the papers in Victoria.

The cost of this campaign was borne jointly by the central station, the manufacturers, jobbers and the electrical contractor-dealers, so that the cost to the individual firm was small. Excellent results are reported, however, as the Christmas trade among the electrical stores was in excess of the anticipated business and even exceeded the volume of the Christmas business a year ago.

Visited New Lamp Works

The Hamilton District Electrical Association and the Hamilton Electrical Development League were the guests of the Canadian Westinghouse Co. at their new lamp works in Hamilton on Tuesday, January 24. Mr Geo. Foot, assistant to the manager of sales, together with Mr. Stewart, superintendent, Mr. Kintner, engineer, and Mr. Orr of the sales staff, conducted the visitors through the works and explained the many different processes in modern lamp manufacturing. A great deal of interest was taken by the visitors in noting the care and selection of materials and the very close inspection of each process to prevent defective lamps being sold to the trade.

After the inspection of the plant, the visitors were conducted to the plant cafeteria, where supper was served—and enjoyed by all. Mr. V. K. Stalford acted as toastmaster. A toast to the Westinghouse Company was proposed by Mr. L. W. Pratt and very ably responded to by Mr. Geo. Foot, Mr. Kintner and Mr. Stewart. The visitors were presented with a souvenir pamphlet and lighting calculator which was very much appreciated. At the conclusion of the meal three cheers for Geo. Foot and the Westinghouse company were given in a very hearty manner. All who took advantage of this trip expressed their appreciation and agreed that it was a wonderful success.

The executive committee of the association are planning several trips to be taken in the future to some of the local plants of interest to the industry at large.

"Felix Penne" at Vancouver Electric Club

A resolution congratulating and commending the management of the B. C. Electric Railway for the able manner in which the change in the rule of the road was carried out, insofar as it concerned that company, was passed at the luncheon meeting of the Vancouver Electric Club held at the Hotel Vancouver on Jan. 20th, and the resolution was ordered to be embodied in a suitable letter to the company.

The club listened to an interesting address from J. Francis Bursill,—"Felix Penne"—veteran journalist of London, England, and Vancouver. The theme developed was [illegible] importance of relaxation, of an interest in art, music, [illegible] and the drama as a part of the broadening necessary for a well-balanced life for any business man. A further suggestion was that the lighter side of literature and the drama was quite as necessary as the more serious and reflective side of the liberal arts, such as reading of standard literature. Mr. Bursill's address was full of practical suggestions most entertainingly presented. Vice-president H. Pim who was in the chair, seconded from his own life habits and experience the value of good reading and similar interests to the business man in keeping himself fit for his own immediate duties as well as those he owed as a citizen.

Westinghouse Radio Broadcasting Newspaper

"Radio Broadcasting News", a weekly newspaper, has been established to mark the first anniversary of KDKA, the radio telephone broadcasting station of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa

The newspaper is believed to be the first of its kind in the United States and the only one devoted solely to the publication of news concerning the activities at one broadcasting station.

About one year ago, the Westinghouse Electric & Manufacturing Company broadcasted its first program from KDKA, which was the first station in the world to give nightly broadcasting programs. Interest in the programs became so great that in the latter months of 1921, there came to the company an insistent demand on the part of "Listeners in" that they be informed "in advance" of the programs to be broadcasted from KDKA.

With this demand—good naturedly given, yet insistent—"Radio Boadcasting News" was born. Today, with only a few issues off the press, it is a fixture. It has come to stay because public opinion has demanded it. The birth of this newspaper marks one of the great forward steps in the marvelous history of the advancement of radio broadcasting.

Radio developments are chief items published in "Radio Broadcasting News," which derived its first circulation list from those friends of radio broadcasting, who after "listening in" on the KDKA programs, wrote to the Westinghouse Company expressing appreciation of the broadcasting service.

The publication gives in word and picture news concerning various broadcasting programs and pictures of artists who entertained radio enthusiasts. A feature of each issue is the program to be broadcasted nightly during the week following the date of issue of the newspaper.

It is estimated that more than 60,000,000 persons are within the range of the four Westinghouse broadcasting stations, the calls, wave lengths and locations of which are as follows:—KDKA, 360 meters, East Pittsburgh, Pa.; KYW, 360 meters, Chicago, Ill.; WJZ, 360 meters, Newark, N. J.; and WBZ, 360 meters, Springfield, Mass.

The program broadcasted nightly by the Westinghouse broadcasting stations include concerts, church services, results of various games of sport, market reports, stories for children and news bulletins.

Copies of "Radio Broadcasting News" will be sent to all persons desiring to receive the newspaper who send their names and addresses to the Editor, "Radio Broadcasting News", Department of Publicity, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Mr. A. B. Cooper, formerly with the Canadian General Electric Company and for the past eight years transformer sales engineer with that company, has been appointed general manager of the Ferranti Meter & Transformer Manufacturing Co., Ltd. Mr. Cooper assumed his new duties on January 16.

We show herewith the Ha'lowe'en window display of the Acme Electric Company, of Moose Jaw, Sask. Mr. Burleson, proprietor of the Acme Electric Company, is to be congratulated on the windows, which indicate that this company is following correct lines in leading the Moose Jaw citizens to do more things electrically.

Making the Most of Your Windows

Have you ever spent even a few precious moments looking over your daily paper—only to find that it was yesterday's?

What did you say?

— — — ! !

Then how do you think the regular passerby regards your windows, if you only provide him with something new to look at every two or three weeks?

Does the electrical merchant make the most of his windows?

Very few of them.

It was recently stated by a successful retailer that he could trace 25% of his sales to his window dressing. Think what that means! All the difference between success and failure—a loss at the end of the year or a fair profit— an A1 credit standing or a sheriff at your door.

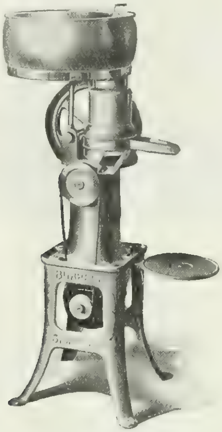
Whatever you neglect in your business (try not to neglect anything), don't let it be your window. Close it in attractively; light it properly; dress it tastefully and often—every day is better than every two days, but never less than twice a week—keep it scrupulously clean and introduce action, movement, in some way.

A Brantford window. T. A. Cowan tells the women how they can improve their standard of living. This display was awarded first prize in a recent contest among some twenty merchants in Brantford.

Newest Developments in Electrical Equipment

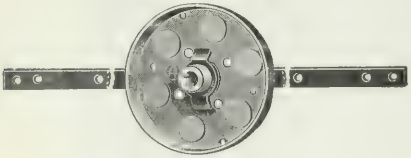
Electric-Driven Cream Separators

D. M. Burrell & Co., Inc., of Little Falls, N. Y., have placed on the market two new cream separators, of the link blade type. Both separators are of high grade construction, with strength and simplicity of design. Due to the present day use of electricity on the farm, the machines have been designed specially for motor drive. The hand machines also have been designed so that they can easily be converted to electric drive within a very few minutes. Three extra parts only are needed for converting the drive, these being the motor, drive belt and pulley. The total height of the new machines is less than 47 inches and the crank is at the standard height of 32 inches from the floor. On account of the simple gearing and the use of a high-grade annular ball bearing to support the bowl, the machine is unusually light-running and quiet. All high speed parts are in an oil-tight case. Westinghouse motors are used on all motor-drive equipped separators manufactured by the Burrell Company.



New Outlet Box

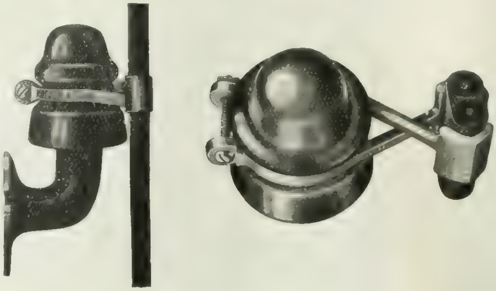
The Canadian Drill & Electric Box Co., Ltd., 1402 Queen St. E., Toronto, are now making the outlet box shown herewith. The advantage of this box is that you can use a 3¼ in. or a 4 in. cover. Another feature is that the cross arm that carries the box will fit either a 12 in. or 16 in. joist. The manufacture of this equipment is in line with a recent regulation of the Hydro-electric Power Commission of Ontario.



The Metal Specialties Mfg. Co., 338-352 N. Kedzie Avenue, Chicago, Ill., announce that they have added the well-known Jorgensen Vapor Primer to their line of Presto products. This Vapor Primer was formerly manufactured and marketed by the Jorgensen Mfg. Co., Waupaca, Wis.

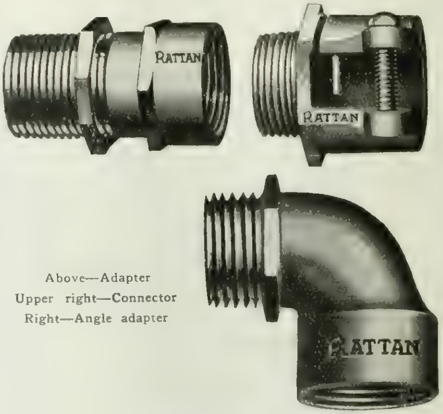
"Thesco" Vertical Clamps

Among the products handled for The States Company by the George C. Rough Sales Corporation, are the "Thesco" vertical clamps, as illustrated. "Thesco" clamps simplify many of the awkward problems met with in line construction, as they make it possible to attach the vertical wire to a common line insulator, keeping the insulator in its correct position where its surface will remain dry and maintain its insulating properties. The George C. Rough Sales Corporation announce that they have recently added two other agencies: Campbell & Isherwood, of Liverpool, England, manufacturers of electric drills; and Schweitzer & Conrad, manufacturers of high voltage protective and switching equipment



Hatheway & Knott Adapters

Hatheway and Knott, Inc., general sales agents, with offices at 117 West Street, New York City, have recently added Outlet Boxes to their line as well as several new devices manufactured by the Rattan Manufacturing Company. One of the new appliances is a galvanized Panel Box Connector Adapter, as illustrated herewith. Another is the 90 degree Angle Adapter for Squeeze Connectors, as shown. These two fittings, we believe, are entirely new, nothing of the kind at present being on the market.



Above—Adapter
Upper right—Connector
Right—Angle adapter

The Cutter Company, Philadelphia, Pa., are distributing a booklet entitled "U-Re-Lite, the Circuit Breaker in the Steel Box;" well illustrated.

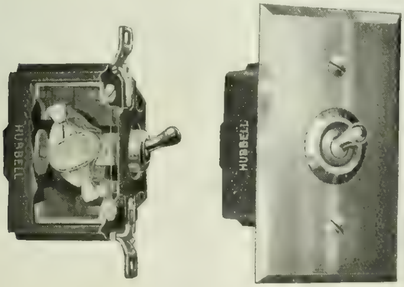
Levolier Pull Socket

W. H. Banfield & Sons, Ltd., are advertising in this present issue, the Banfield Levolier pull socket. This socket was formerly manufactured by the McGill Manufacturing Co., Valparaiso, Ind., but is now being manufactured in its entirety at the Banfield factory in Toronto. For heavy duty 660 watt service as required by the Hydro-electric Power Commission, the Banfield Levolier is said to be specially adapted. The method of construction of the make and break mechanism inside the porcelain of the socket is on the same principle as the old type of knife switch. The break is positive, being made with a very fine coiled spring.

Catalog No. 65250
1.8 inch Cap

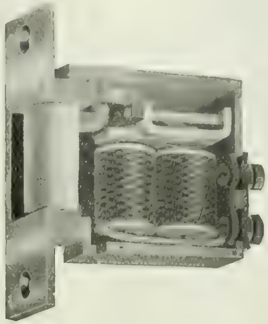
New Toggle Flush Switch

Harvey Hubbell, Inc., Bridgeport, Conn., has recently placed on the market the neat toggle flush switch illustrated herewith. Its make-and-break action is almost instantaneous, the toggle compressing and guiding a spring which instantly operates the switch. Entire freedom from flashing or binding is claimed by the manufacturer. This switch is provided with adjustable aligning lugs which fasten the switch body flush with the plaster, regardless of how carelessly the outlet box itself may have been installed. The toggle operates at the same tension without regard to the length of time the current may be on.



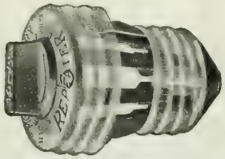
Electric Door-opener

The Electrical Products Manufacturing Co., 69 Sprague St., Providence, Rhode Island, has recently placed on the market an electrical door opener, of sturdy design. The castings are die-cast manganese bronze, which gives increased protection against forcing the door or breaking the lock and at the same time prevents excessive wear. The magnets are wound on automatic machines and claimed to be so produced that neither weather conditions nor abuse can affect the efficiency of the device. This equipment is very compact, the dimensions being: face plate, 1¼in. x 3½in.; mortise, 2-3/16 in. x 3 in. x 1⅛ in.



New Fuse Plug on Canadian Market

A new manufacturing concern, The "Repeater 6" Fuse Plug Co. of Canada, Ltd., situated at Burlington, Ont., has purchased the Canadian manufacturing and selling rights of the "Repeater 6" Fuse Plug and will have its plant in operation by February 1st; its capacity will be 10,000 plugs per day.



In the Repeater 6, illustrated herewith, there are six fuses; when one blows out, by simply turning the knob to the right contact is instantly restored, leaving five more fuses for further use. This plug, it is claimed, thus removes many of the annoyances caused by the sudden blowing out of ordinary fuse plugs.

Illuminating Engineering Meeting

The January meeting of the Illuminating Engineering Society, Toronto Chapter, was held on Monday evening, January 16th, in the Chemistry and Mining Building, University of Toronto. The subject of the lecture was "Gas-filled lamps," by Mr. Watson Kintner, lamp engineer of the Canadian Westinghouse Company. The lecture was illustrated by lantern slides. Mr. Kintner also brought several parts of lamps with which to demonstrate the process of manufacture.

The Sangamo Electric Co., Springfield, Ill., are distributing Bulletin No. 59, describing, with illustrations, Brooks two-stage current transformers.

Electric Railways

Rehabilitation of Toronto's Electric Railway System—III

The new cars are Equal to the best on the Continent—and Then Some Improvements

The type of street car as used by the Toronto Transportation Commission on the Yonge, Broadview and College routes had its first development in Cleveland, in 1914. After several months' trial, under close observation in that city, a standard design was adopted which is now used not only in Cleveland, but also in Buffalo, Toledo, St. Louis and other U. S. cities. For example, Detroit has just within the last few days put a number of these cars in commission.

This type of car was first tried on routes having a heavy transfer service and it was found to handle larger numbers of passengers in a minimum space of time.

The Motor Cars

The majority of the new motor cars purchased by the Toronto Transportation Commission were made by the Canadian Car & Foundry Co. of Montreal. The Montreal order consisted of 140 motor cars and 60 trailers. A second order was later placed with the Canadian Brill Company for 50 of the same type of motor car. All these cars are much larger than the former cars used by the Toronto Railway Company. The motor cars are 51 ft. 8 in. long over buffers and 8 ft. 4-3/16 in. wide over side sheathing, the side sheathing being a special rolled plate for car purposes. The trailers are 49 feet long.

The information that follows immediately hereafter refers particularly to the Montreal cars. The Brill cars are referred to later in the article.

One hundred of these motor cars are equipped with Canadian Westinghouse 533-T-4 motors and K-35 controllers, while the remaining 40 are equipped with English Electric Company controllers. Gears and pinions are all helical.

The trucks are all 5 ft. 10 in. wheel base and have 30 in. wheels. They are inside suspension type with roller side bearings. The trucks are specially designed to make the car smooth riding; a system of spiral springs which provides easy action when the car is lightly loaded is a great advantage over former types of construction. When the car is fully loaded a semi-elliptic spring takes care of the load. The wheels have a 2¼ in. tread, though the intention is to increase this eventually to 2¾ in.; this will give much better traction and better wheel and rail wear conditions.

Westinghouse semi-automatic air brakes are used; this equipment includes a compressor having a capacity of 16 cu. ft. per minute. Slack adjusters on the brake cylinders provide proper adjustment for brake wear. Conductor's emergency valves to operate the brakes are located at the conductor's stand and at the rear of the car. The emergency valves supply full air to the brakes and sand to the wheels in one application. All cars are also furnished with an auxiliary hand brake.

The Peter Smith system of forced air distribution is used throughout. A very uniform distribution of fresh, warm air is provided by a fan which draws air from the outside, forces it through a heated chamber and discharges it evenly into the car through ducts under the seats. By this system the car is ventilated as well as heated, tests having shown that the air is completely changed approximately every five minutes. Ventilators placed in the roof are so designed as to be proof against rain or snow entering the car.

All the wiring in the cars is in rigid metal conduit. Illumination is supplied by fifteen 40 watt mill type lamps. Each lamp is equipped with an opalescent Moonstone reflector, supplied by the Jefferson Glass Co. There is also a circuit of five 23 watt mill type lamps for the signs and headlight. The headlight unit is Crouse-Hinds type. Indicating lamps on the rear of the car show green when power is on and red when power is off.

The body of the motor car is practically divided into two parts; these are of approximately the same area. Entrance is by the front door and the forward portion provides an ample loading area. The conductor is placed near the centre of the car and the passenger may either ride in the front part without having yet paid his fare or he may pass the conductor, depositing his fare as he does so, and take a seat in the rear half of the car. Both the entrance and the exit are provided with double doors, width 5 ft. 6 in., which provides sufficient room for two rows of passengers. The entrance steps drop as the doors are opened and are raised with the opening of the doors. All steps are fitted with safety treads. The doors are inter-locked with the control so that the power is shut off until the doors are closed.

The seats in the front half of the car are longitudinal, as shown in the figure. Cross seats are provided in the rear half. An overhead hand rail takes the place of the familiar strap. Both entrance and exit steps are low, being only about 14 in. from the ground.

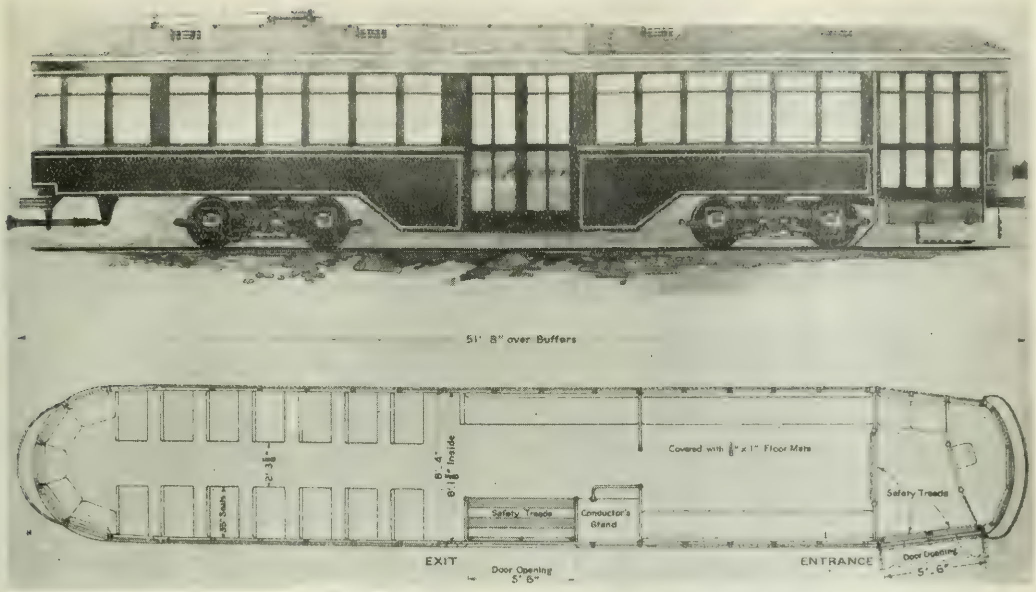
For the convenience of passengers, a push button which sounds a signal buzzer in the motorman's cab is installed on every side post. In addition to this there is a signal system for the use of the conductor and motorman—a single stroke bell at each end of the car, which is operated by push buttons in the motorman's cab, at the conductors' stand and at the rear of the car.

In spite of their length, these cars can operate on a curve of 34 ft. 4¼ in. centre radius. In fact, on some of the Toronto streets they are at present operating on curves of even smaller radius than this.

The cars are painted outside with a red enamel finish; the interior trim is of birch, stained cherry color. Double floors are used throughout and there are no trap doors or openings in these floors. Window guards are fitted on both sides of the car. The seats and backs are hardwood and there is practically no place in the car that can catch dirt or dust.

The Trailers

The trailers, which have been purchased to the number of 60, are very similar in design to the motor cars. They are 49 ft. long, 8 ft. 4¾ in. outside width; weight, 28,000 lbs. as compared with 49,000 for the motor cars. They will seat 61 passengers as compared with 57 for the motor car, the extra seating capacity being gained, in the trailer by the space taken up by the motorman's cab. In the trailer, entrance and exit doors are in the centre of the car, with the conductor's stand between them, as shown in the figure.

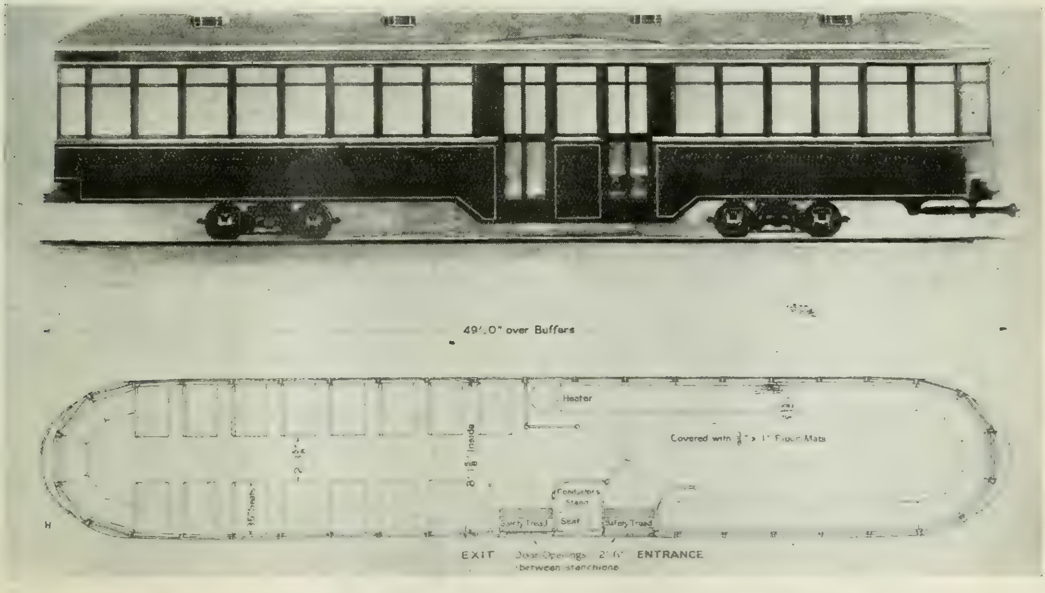


Motor Car—Seating capacity 57—Front entrance, centre exit—Toronto Transportation Commission

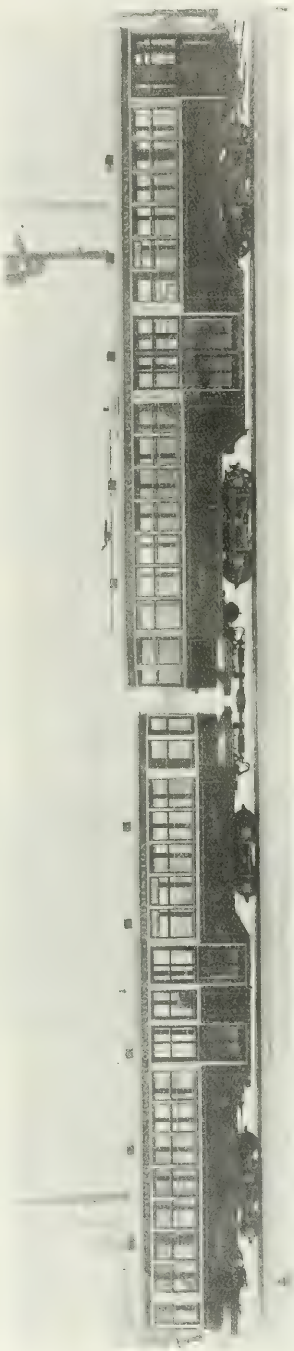
Here, also, the car is divided into approximately two equal spaces, the forward half of which provides a very ample loading area. The passengers may either remain in this forward portion without having yet paid their fares or they may move around the railing, shown in the reproduction of the trailer herewith, and pass the conductor, depositing their fares as they do so, and then seat themselves in the rear half of the car.

The air brakes and lighting circuits on the trailer are connected through couplers to the motor car. As will be noted in the picture, the entrance and exit doors are single in the trailer.

The experience in Toronto bears out the reports from other cities that have used this type of car regarding the facilities for loading and unloading. Anywhere from 20 to 40 passengers can be taken on or discharged about 30 per cent



Trailer—Seating capacity 61—Centre entrance and exit—Toronto Transportation Commission



Toronto Transportation train with seating capacity for 118 persons. These are all-steel bodies, birch interior trim, red enamel exterior, presenting a very handsome appearance. Motor cars are front entrance, centre exit; trailers, centre entrance and exit. In both cars forward half constitutes commodious loading platform

quicker than in the older type of car with rear entrance and front exit. With larger cars, the advantage is still more in favor of the new type.

Canadian Brill Company

An order for 50 of these cars was subsequently placed by the Toronto Transportation Commission with the Canadian Brill Company of Preston, Ont. There is practically no difference in the design of the cars except that they are somewhat lighter in weight and the roof design of the Brill car follows a somewhat sharper curve, i.e., it represents pretty accurately an arc of a circle, as compared with a flatter curve for the Montreal type.

In the following table there is outlined a list of the equipment and the names of firms that supplied it for both the Montreal and the Preston cars:

Montreal Cars.

Equipment **By whom supplied**

Car bodies—Canadian Car & Foundry Co.
Air Brakes—Canadian Westinghouse Co.
Axles—Dominion Wheel & Foundries Co., Ltd.
Wheels—Dominion Wheel & Foundries Co., Ltd.
Bumpers—Hedley Company
Buzzers—Electric Service Supplies Co.
(Lyman Tube & Supply Co.)
Conduits & condulets—Canadian General Electric & Crouse-Hinds
Couplers—Ohio Brass Company
Destination signs—Electric Service Supplies Co.
Door operating mechanism—National Pneumatic Co.
(Dominion Wheel & Foundries Co.)
Fare boxes—Canadian Cleveland Fare Box Co.
Fenders & guards—Canadian Car & Foundry Co.
Gears & pinions—Allen General Supply Co. & R. D. Nuttall (Westinghouse)
Hand brakes—National Brake Co.
(Lyman Tube & Supply Co.)
Heaters—Peter Smith Heater Co.
Headlights—Crouse-Hinds Co.
Headlining—Pantasote Company
Lightning arresters—Canadian Westinghouse & Dick Kerr
Motors—Canadian Westinghouse & Dick Kerr
Enamel paint—Pratt & Lambert
Sanders—Ohio Brass Co.
Sash fixtures—O. M. Edwards & Co.
Seats—Hale & Kilburn Corporation (C. S. Wright)
Treads—American Mason Safety Tread Co.
Tail lights & ventilators—Nicholls-Lintern Co.
(Railway & Power Engineering)
Trolley Catchers—Earll Company
(Railway & Power Engineering)
Trolley poles—National Tube Co.
Trolley wheels—Star Brass Co.
Controllers—K-35 and English Electric Q2-D
Trucks—Canadian Car & Foundry (cast steel frame)

Brill Cars

Same as Montreal cars, with following exceptions:—

Car bodies— Canadian Brill Co.
Conduit & condulets—Conduits Co. Ltd. & Crouse-Hinds
Fenders & guards—Canadian Brill Co. (HB type)
Headlining—Nevasplit
Lightning arresters—Canadian Westinghouse
Motors—Canadian General Electric
Seats—Canadian Brill Company
Treads—Feralun
Controllers—K-35
Trucks—77-E-1 Brill (forged frame)

Current News and Notes

Antigonish, N. S.

The telephone office of the Maritime Telegraph & Telephone Co., Antigonish, N. S., was considerably damaged by fire recently.

Calgary, Alta.

The Crane-Cassidy Electric Co., 129 Fifth Ave. E., Calgary, Alta., has been awarded the electrical contract on a building to be erected at 8th Avenue & Centre St., Calgary, for the Royal Bank of Canada, at an estimated cost of $35,000.

Guelph, Ont.

The G. E. B. Grinyer Electric Co., Guelph, Ont., has secured the electrical contract on a dairy building being erected for the Ontario Agricultural College, Guelph, at an estimated cost of $60,000.

The Canada Electric Co., 175 King St. E., Toronto, has been awarded the electrical contract on a veterinary building recently erected by the Ontario Agricultural College, Guelph, Ont., at an approximate cost of $60,000.

A report states that the electors of Guelph, at the municipal elections, voted almost unanimously in favor of Sunday street cars.

Hull, Que.

In accordance with its previous notice, the Hull Electric Railway Company recently reduced the wages of its employees ten per cent. This action was disputed by the men with the result that a Conciliation Board was appointed. The Board's majority report recommends that the rate of wages in effect since August, 1920, continue until at least July 1, 1922, and that the wages deducted by the 10 per cent. cut be paid back to the men.

Keremeos, B. C.

Messrs. Farr, Robinson & Bird, 546 Howe St., Vancouver, have been awarded the contract for electric fixtures for the bank building recently erected at Keremeos, B. C., by the Canadian Bank of Commerce.

Kitchener, Ont.

The Kitchener Light Commission, Kitchener, Ont., are receiving tenders on 220 gross tons of steel rails and 1,000 steel ties. Work on street railway extension will be started in the spring.

Levis, Que.

Messrs. Napoleon & Lepage, Bienville, Que., have secured the contract for electrical work on a Monastery to be erected at Levis, Que., for the R. R. Sisters Visitandines, at an estimated cost of $100,000.

Moncton, N. B.

The T. Johnston Co., Ltd., 895 Main St., Moncton, N. B., has secured the electrical contract on a $75,000 skating rink recently erected at Sunny Brae, Moncton.

Montreal, Que.

Messrs. Demers & Prevost, 189 Bernard St., Montreal, have secured the contract for electrical work on the St. Aloysius School, recently erected on Adam St., Montreal, at an approximate cost of $210,000.

Mr. W. Rochon, 454 Lafontaine Park, Montreal, has secured the electrical contract on a $90,000 warehouse recently erected for Mr. S. L. Content, 590 Marie Anne St., Montreal.

Ottawa, Ont.

Mr. Stan Lewis, 63 Metcalfe St., Ottawa, has secured the contract for electric wiring on a toboggan slide at the Ice Palace in Lansdowne Park, Ottawa.

Paynton, Sask.

The contract for a telephone system for the town of Paynton, Sask., was recently awarded, by the Saskatchewan Department of Telephones, to Mr. F. A. Kelly, a contractor of Regina, Sask. It is understood that work on this system will commence at once.

Penticton, B. C.

The Penticton Electric Company, Penticton, B. C., has been awarded the contract for installing electrical equipment in the new Canadian Bank of Commerce, Keremeos, B. C.

Port Moody, B. C.

A report states that Messrs. Thurston & Flavelle, Ltd., of Port Moody, B. C. will electrify their sawmill, which is located on the water front at Port Moody.

St. Thomas, Ont.

The Hydro-electric Commission, of St. Thomas, Ont., announces that at the end of 1921 their books show a substantial balance on hand; this despite the fact that more than $10,000 was refunded to consumers, in rebates, during the year. Mr. H. K. Sanderson was elected chairman for his ninth consecutive term.

Three Rivers, Que.

Mr. J. B. Badeux, Three Rivers, Que., has been awarded the contract for electrical work on an extension being built to the St. Philippe Ward school, Three Rivers, at an estimated cost of $120,000.

Toronto, Ont.

Messrs. Bates & MacPherson, 33 Richmond St. W., Toronto, have been awarded the electrical contract on a church and Sunday School building recently erected on Belsize Drive, Toronto, for the Belsize Avenue Presdyterian Church.

Mr. J. Deemert, 34 Pauline St., Toronto, has been awarded the contract for electrical work on an apartment house recently erected at Ossington Ave. & Bloor St., Toronto, for Mr. Fred Reilly, 743 Dovercourt Road.

Mr J. B. Forsey, 159 Wychwood Ave., Toronto, has been awarded the contract for electrical work on two stores being erected at Roncevalles & Garden Avenues, Toronto, for Mr. W. R. MacDonald, 177 Roncevalles Ave.

Victoria, B. C.

Messrs. Fox & Mainwaring, Victoria, B. C., have been awarded the electrical contract on a building being erected on Fort Street, Victoria, for the Victoria Baggage Co., 506 Fort St.

Walkerville, Ont.

The Public Utilities Commission of Walkerville, Ont., received tenders up to January 31 for the erection of a building for offices for the commission and a sales room for electrical appliances. The building will probably cost in the neighborhood of $75,000.

Welland, Ont.

Mr. F. Sage, Welland, Ont., has been awarded the contract for electrical work on a fertilizer plant to be erected at Dain City, Humberstone township, at an approximate cost of $85,000 for the Cross Fertilizer Co., Ltd., Sydney, N. S.

Westmount, Que.

The Vincent & Say Electric Co., 344 Union Avenue, Westmount, [illegible], has been awarded the [illegible] electrical work on an addition being built to the [illegible] ers, [illegible] Ave., Westmount, at an [illegible] cost of [illegible]

Mr. H. [illegible] Cassidy, 255 Regent Avenue, Westmount, Que., has [illegible] the contract for electrical work on an addition being built to the Royal Bank of Canada building at Victoria Ave. & Sherbrooke St., Westmount, at a cost of from $15,000 and $20,000.

Winnipeg, Man.

The McDonald & Willson Lighting Company, 309 Fort St., Winnipeg, has been awarded the contract for electrical work on a ski jumping hill being erected at Broadway & Osborne Sts., Winnipeg, for the Winnipeg Winter Carnival, 203 Tribune Building, Winnipeg.

Revenue obtained by the Winnipeg Hydro-electric system for 1921 was $67,586 more than for 1920, it is reported. The total revenue from this source in 1920 was $127,254, and for 1921, $194,840.

Tenders were received by the Chairman, Public Utilities Committee, City Hall, Winnipeg, Man., up to Monday, January 23, 1922, for a supply of pole type transformers and approximately 52,000 ft. of high tension, lead covered cable. He will also receive tenders up to 3:00 p.m., Monday, February 6, 1922, for automatic induction regulators.

The Quality Electric Co., Simcoe St., Winnipeg, has secured the contract for electrical work on a building being erected at Redwood & Main Sts., Winnipeg, for Northern Motors, Ltd., 601 Union Trust Building, at an estimated cost of $32,000.

Woodstock, Ont.

Prices on a number of electric fire places are being asked for by Mr. R. E. Butler, Windsor, Ont. Mr. Butler is building an addition to his business block in Woodstock, Ont., and plans to install fire-places in a number of rooms.

The Electrical Co-operative Association, Province of Quebec, will hold a rousing "Get-together" Smoker on the evening of February 8, at the Windsor Hotel, in Montreal. Those who have experienced Montreal's hospitality will anticipate a thoroughly enjoyable evening. The prime idea underlying this meeting it to get better acquainted so that the co-operative movement may be more effectively and efficiently carried through. If any electrical man, within reach of Montreal, feels that he is not well acquainted with every other man in the industry, he should be found, on the evening of February 8, at the Windsor Hotel smoker.

A pair of Wires and a Dial

The Northern Electric Company are sending out an interesting booklet, entitled "A Pair of Wires and a Dial." This booklet is written with the idea of popularizing the Strowger automatic telephone equipment. The automatic telephone is being used more extensively all the time and should have the attention of the contractor-dealer to a greater extent, we think, than it has in the past. Every building from the size of the average home to the largest factory and warehouse is a prospect for an automatic telephone system. The Toronto office of the Northern Electric Co. have just advised their customers that they have on their staff an automatic telephone engineer who will be pleased to consult with the [illegible] dealer and co-operate with him in making the sale to his prospect.

Know a Good Man

At the recent municipal elections Mr. E. W. Sayer, of the Sayer Electric Co., electrical contractors and dealers, 85-87 Bleury St., Montreal, was re-elected alderman for the city of Outremont. The electors of that district evidently know enough to hold on to a good man when they once get him. This is Mr. Sayer's third term in office.

Tenth Midwinter Convention of the A.I.E.E.

The Tenth Annual Midwinter Convention of the American Institute of Electrical Engineers will be held February 15-17, 1922, in the Engineering Societies Building, 33 West 39th Street, New York, N. Y. This will be the first convention to be held under the new ruling of the Board of Directors which prescribes but four general technical meetings of the Institute to be held each year.

More Leisure Hours

To sell the idea of more time for the enjoyable things of life is the primary object of an attractive little booklet which The Society for Electrical Development is ready to distribute. "More Leisure Hours" is the title, and in 24 entertainingly written and illustrated pages the booklet tells how hours of drudgery may be eliminated by the use of electric service and appliances.

The Telephone Echo

The latest issue of the "Telephone Echo," published by the Manitoba Government Telephones, is a very creditable and interesting little magazine. An interesting item notes there are four and a half million independent telephones in North America—that is, outside of the Bell system, which comprises about nine and a half million—a total of fourteen million for the continent.

Packard in new offices

The Packard Electric Co., St. Catharines, announce that business has been increasing so rapidly that they have found it necessary to vacate their present Toronto office in the Temple Building, and are moving about the 15th of February into new offices at No. 308 & 309, third floor, of the Brass Building, at the corner of Adelaide & Yonge Sts. These offices are very commodious and we believe their customers will appreciate the change, as the Packard Electric Co. state they will now be able to take still better care of them than in the past.

The Robbins & Myers Company, Springfield, Ohio, are distributing their "Domestic Catalogue," No. 1177, dealing with electric fans for alternating and direct current circuits, non-oscillating, oscillating, ceiling and ventilating. The catalogue is well illustrated with an attractive color design, and very complete descriptions of the construction details of the various equipment.

Immediate consideration by the 1922 Winnipeg city council of the Winnipeg electric railway problem, and a prompt decision whether or not the city shall buy the property in 1927 as a public utility, was urged by Mayor Parnell in his address at the inauguration meeting of the new city council.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

SUBSCRIBERS

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Vol. 31 ***Toronto, February 15, 1922*** ***No. 4***

Canadian Electrical Council Will Co-ordinate Various Organizations

Action taken by a group of representative electrical men, meeting recently in Montreal, looks like the beginning of a much closer co-operation of the various sections of the electrical industry throughout Canada.

Our readers may remember a suggestion contained in the issue of the Electrical News of July 15 last in which it was pointed out that a considerable duplication of effort existed in connection with the two central station organizations—the Canadian Electrrical Association and the Association of Municipal Electrical Utilities— and the question was raised as to whether these two organizations might not in some way get together to prevent, or at least greatly reduce this overlapping. In our August 15th, and following issues, letters expressing the opinions of electrical managers, superintendents and others holding prominent positions in the industry, were reproduced in extract and the outcome was that a meeting was held in Toronto, in October last, composed of representatives of the C. E. A., the A. M. E. U., the A. I. E. E. and the Electrical Supply Manufacturers', Jobbers, and Contractor-Dealers' Associations. At the conclusion of this conference a resolution was adopted favoring the convening of a still more representative committee, at a later date, to be composed of representatives of every electrical organizations within reach of the two provinces.

This second meeting was held in Montreal, on February 6, and the interest taken in the matter of closer co-operation is, perhaps, best indicated by the personnel of the representativesof the various organizations. For the Canadian Electrical Association there were present Julian C. Smith, vice-president and general manager of the Shawinigan Water & Power Co., and president of the Association; A. A. Dion, superintendent of the Ottawa Electric Company; J. B. Woodyatt, general manager of the Southern Canada Power Company, and M. K. Pike, sales manager, Northern Electric Company. For the Association of Municipal Electrical Utilities of the province of Ontario,M. J. McHenry, general manager Municipal Hydro System, Walkerville, and president of the Association; O. H. Scott, manager of the Municipal Hydro System, Belleville, Ont., and P. B. Yates, manager of Public Utilities, St. Catharines. The American Institute of Electrical Engineers (Canadian Division) was represented by W. A. Bucke, Canadian General Electric Company and Wills Maclachlan; the Ontario Association of Electrical Contractors and Dealers by Kenneth A. McIntyre, president; R. A. L. Gray, Toronto, and W. McKenzie, St. Catharines; Canadian Electrical Supply Manufacturers' Association, by M. K. Pike and Mr. Sorber; Canadian Electrical Supply Jobbers' Association, by S. W. Smith; the Canadian Electric Railway Association, by E. Blair, Montreal Tramways Company; the Electrical Co-operative Association, by K. B. Thornton, managing director Montreal Public Service Corporation; J. A. Anderson, president English speaking section Quebec Association of Electrical Contractors & Dealers, and De Gaspe Beaubien. Secretaries J. A. McKay, Eugene Vinet and Louis Kon were also in attendance.

The Meeting Fully Representative

The whole industry may thus be said to have been well and fairly represented. Every phase of the question of co-operation, with a view to greater efficiency in the industry, was discussed, and it can well be said that practically every member of the committee took an absolutely broadminded view of the whole situation, apparently having no thought in mind beyond arriving at a conclusion that would have the most far-reaching benefits for the electrical industry as a whole throughout the Dominion of Canada.

Results Represent Progress

The discussion was of passing interest but the final action of the committee represents permanent progress. Before the meeting adjourned it was moved by Julian C. Smith, seconded by M. J. McHenry and agreed to unanimously, that an advisory body be formed, to be known as the Canadian Electrical Council, to be composed of four representatives each from the Canadian Electrical Association, the Association of Municipal Electrical Utilities and the Canadian Electrical Supply Manufacturers' Association. In the meantime the duty of this Council shall be to receive or initiate suggestions, and make recommendations thereon, regarding the closer co-operation of the different elements in the industry, i.e., the Council shall be, in a sense, a clearing house for suggestions regarding co-operation among its three constituent members. A sub-committee is to be appointed by the Council that will deal more particularly with questions of common interest between the C. E. A. and the A. M. E. U., and a second sub-committee, also appointed by the Council, will give its attention to the merchandising phase of the industry with a view to better and more general organization. It was also the sentiment of the Committee that, should the Canadian Electrical Council demonstrate its ability to function usefully, its activities may be extended by the addition of members from other all-Canadian associations, such as the jobbers', contractors', dealers' or electrical engineers', and the discussion of the new questions that would be involved.

First Meeting Toronto, March 13

The newly formed Canadian Electrical [illegible] will hold its first meeting in Toronto on March 13. In the meantime the three organizations concerned will appoint their representatives.

Railway Signalling

The regular meeting of the Toronto Section of the American Institute of Electrical Engineers was held in the Electrical Building of the University of Toronto on the evening of January 27, W. P. Dobson presiding. Mr. C. W. Parker of the Canadian Pacific Railway, addressed the meeting on the subject "Railway Signalling."

Mr. Parker first pointed out the inherent differences between double and single track signalling, showing how in the one case it was necessary only to protect trains from the rear, while in the other it was necessary to protect them both before and behind. He then called attention to the low value of the voltages and currents used in this work and to the various sources from which electrical energy was obtained for signalling purposes.

The speaker gave an outline of the development of interlocking systems, pointing out that the first interlocking system in Canada was installed in Toronto in 1894. He then gave a description of the working of the electrical staff systems in use, and showed how they were combined with the signalling systems along the right of way. A large number of other features of electrical, mechanical, and electro-pneumatic signalling systems were described, and some valuable data as to the costs of installation given.

East Angus, Que, Installs Fire Alarm System

A most complete and up-to-date municipal fire alarm signal system was put into service at East Angus, January 13th. The apparatus is of the most modern type, the signal boxes being of the same design as those used in the larger cities of Canada and the United States. There are 21 street signal stations, an automatic whistle blowing machine, two electro-mechanical gongs, an automatic punch register and central office storage battery equipment. The boxes are of the positive non-interfering type,—that is the mechanism is so arranged that no matter whether one box or ten or more are "pulled" at the same time there will be no interference between signals and all boxes "pulled" (or operated) will sound their number, one after the other. For example, when the system was officially tested by the members of the council three boxes were "pulled" or started simultaneously by three different persons. All the boxes started running and struck their respective numbers one after the other. When a box is operated for fire it sounds its particular number on the special steam whistle at the mills of the Brompton Pulp and Paper Co., on a gong at the fire chief's residence and on a gong at the fire hall, at the same time operating a punch register which records the box number by punching the code in a paper tape at the fire hall for future reference and also as an aid to the fire department in checking their audible count of the alarm. The complete system was furnished and installed by the Century Electric Company, 619 St Paul St. W. Montreal, who have recently entered the municipal fire alarm field, representing the Foote Pierson Co., of New York and The Holtzer-Cabot Electric Co., of Boston

Mr. J. J. Wright Lives to see Phenomenal Development in the Industry He Pioneered

Mr. J. J. Wright, the pioneer of pioneers of the Canadian electrical industry, is dead, at the age of 72 In noting this fact, with deepest regret, may we simply recall to our readers some interesting facts in the life of the late Mr. Wright recounted in the Electrical News of July, 1911, when he was the subject of one of our series, then running, "The Makers of Electrical Canada." We quote:—

"In the year 1881, in a little back room loaned for the purpose, by the Firstbrook Box Factory, on King Street, Toronto, the first Canadian-made electric generator was in progress of construction. It was a big generator in those days, though only a twenty-five horsepower. The generator completed, a set of arc lamps of a primeval type were constructed and this apparatus was installed near the northeast corner of King and Yonge Streets. The twenty lamps were placed in various stores on Yonge Street, the late Timothy Eaton being one of the first customers.

"The building of the apparatus, its installation and the operation of this, the first electric lighting system in Canada, were the sole work of one man, a true pioneer in Canada's electrical development, Mr. J. J. Wright."

Further on, the article has this to say of Mr. Wright's pioneering: "It was in the same year that Mr. Wright showed his undoubting confidence in another form of electrical activity. In 1883 he and Mr. Van Depoele had fitted up and exhibited during the annual Toronto Exhibition the first Canadian electric railway system. It was not an entire success the first year but the following season, 1884, Mr. Wright secured an old Grand Trunk flat car, placed a 25 h.p. motor on it, belted the motor to the car axle and successfully operated a train of three coaches from the foot of Strachan Avenue to the Exhibition grounds. For three or four years, at the same season, this road continued to demonstrate the feasibility of electric railway operation. This was only three years after Siemens, in Germany, had experimented on the first public electric railway the world had ever seen."

And again, "In still one other notable respect Mr Wright has shown his interest in Canadian electrical matters. He was one of the small group which in 1891 was instrumental in organizing the Canadian Electrical Association. His helpful assistance was shown by the fact that he was the association's first president, which office he held for several consecutive years."

In recent years, Mr. Wright had spent most of his time within sight and sound of Lake Ontario, at Niagara-on-the-Lake, where to the last he maintained his love of the open air and the freedom of country life. One cannot but wonder with what satisfaction he must have followed the development of the industry from his own 25 h.p. generator, in 1881, to the 50,000 h.p. generator so recently installed almost on his very door-step—the yield of his own sowing—not the proverbial twenty or sixty or hundred fold but a full two thousand fold in his own day and generation.

First 50,000 h.p. Unit of Chippawa-Queenston Power Scheme—I.

A Series of Articles Describing the Preliminary Investigations, the Design and Construction of the Greatest Undertaking of its kind in the World. Some Wonderful Photographs. Whole work carried to Successful Issue by Canadian Engineers. Practically all equipment Canadian Made

From many view points the official opening of the Chippawa—Queenston hydro-electric generating plant on December 28th last, marks an epoch in Canadian history.

To begin with, it is a colossal enterprise, the ultimate success of which must have caused the engineers, who were charged with the responsibility, many anxious months.

As finally planned this development is the largest hydro-electric scheme in the world, utilizes the largest capacity units, and represents more pioneer work of a kind for which there was no precedent to act as a guidance.

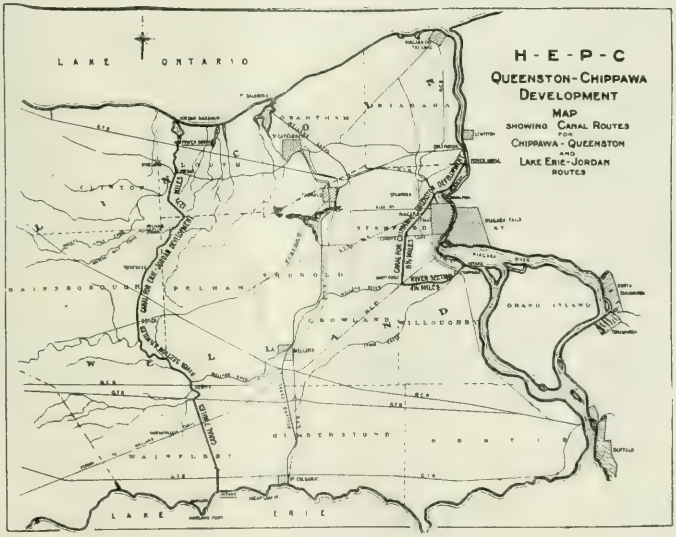
Of even more significance, however, than the size of development adopted, the full natural force of Niagara's power is brought under control for the use of man. Other and earlier developments at Niagara had not attempted this ideal, and Canada's engineers must be given all credit for the courage that enabled them to grapple with and solve a problem upon the solution of which so much depended.

To the citizens of the province, it is most important to know that this natural resource is being utilized to the fullest extent and that all the benefits of this great natural heritage will accrue, either directly or indirectly, to every man, woman and child within electrical transmission distance of this great power centre.

Inasmuch as the official opening marks the completion of the civil and mechanical sections of the work, a general review of the whole project seems to be justified. If in the pages that follow we repeat certain information that has already been published in the Electrical News, it is because we desire that the present series should constitute a complete history of this greatest of hydro-electric projects.

Selecting the Proper Location[*]

From the combined viewpoint of conservation and ultimate economy, the ideal Niagara development would be one that would utilize the whole of the future available water under the gross head of 327 ft. existing between Lake Erie and Lake Ontario. Several schemes, approximating this ideal in varying degree had been advanced during the last 20 years, the most practicable and promising of which was known as the Jordan-Erie scheme. This involved the intaking of water near Morgan's Point on Lake Erie, the building of an open waterway across the Niagara Peninsula to the brink of the escarpment above Jordan Harbour, thence carrying the water to the power-house at Lake Ontario level through a mile of pipe. Studied from an engineering standpoint, this scheme was open to serious objection for three main reasons, first, the unavoidable intake conditions at Lake Erie; second, the structural difficulties and unavoidable head loss in connection with the 24-mile canal;



This map shows the relative positions and lengths of the Erie-Jordan and the Chippawa-Queenston canals.

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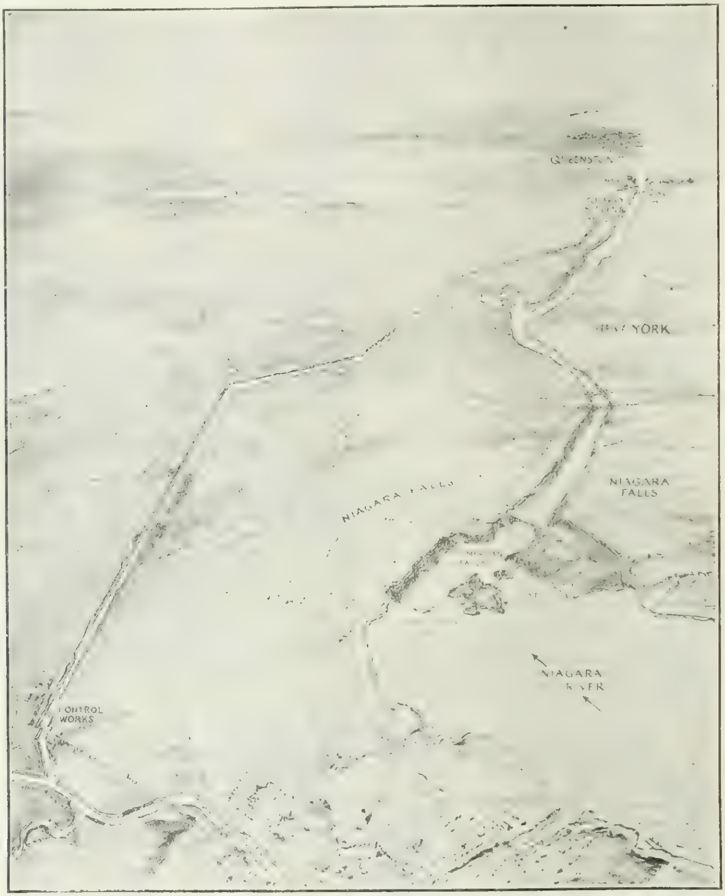
[*] Harry G. Acres, Chief Hydraulic Engineer, Hydro-Electric Power Commission of Ontario.

and the third the regulation difficulties attendant upon the control of a mile long water column in the penstock connection between the head of the canal and the power-house, where something over 16 feet of penstock would be necessary for each foot of effective head.. The economic effective head for this scheme worked out slightly less than 300 feet, the bulk of the losses being, of course, taken up in the long canal.

The problem was, therefore, to find some feasible location that would overcome objections to the Jordan-Erie scheme. During the course of the subsequent investigations, it developed that by far the best intake conditions would be obtained at the mouth of the Welland River at Chippawa; also that suitable power-house locations were obtainable in the gorge between Foster's Flats and Queenston, which would require only about 18 inches of penstock connection for each foot of effective head, thus reducing the regulation problem to one of minor importance.

Pressure Canal versus Open Canal

Having tentatively solved the intake and regulation problems, it remained to determine whether or not it was feasible to construct a suitable waterway between the Chipawa intake and the power-house location above Queenston. An exhaustive series of surveys and core-drill borings established the fact that it would be entirely feasible to connect these two points by either the open canal or the pressure tunnel type of waterway. The next problem was to determine which of these two types of waterway would be the more suitable from the combined viewpoint of pure hydraulics, structural difficulties and hazards, and comparative cost.



Bird's eye view of Queenston-Chippawa development showing intake from Niagara River above the Falls with Welland River section in foreground leading water to control works at upper end of canal which stretches to power house at Queenston where water is returned to the lower Niagara River.

In the matter of comparative cost, carefully compiled estimates indicated that throughout the full range of assumed carrying capacities, the open canal had a decided advantage over the pressure tunnel.

Pressure Tunnel Disadvantages

In the matter of structural difficulties and hazards the following main points were given consideration in the case of the pressure tunnel:—

(a) The necessity of driving the headings at an acute angle through the various limestone, shale and sand-stone formations, involving the certainty of [illegible] overbreak and expensive timbering and lining.

(b) The unfavorable conditions [illegible] regards the disposal of excavated material.

(c) The unknown water hazard and the impossibility of predicting the cost of unwatering within reasonable limits of accuracy.

(d) The difficulty and hazard attending the driving of, and maintaining a pressure tunnel of unprecedently large diameter in the clay formation of the Whirlpool Ravine.

(e) The difficulty in connection with the construction of a distributing chamber in the shale and sandstone at Queenston.

As against the above, the difficulties and hazards in the case of the open canal were limited to two main points; first, the removal of the earth overburden in the canal prism, and second, the permanent holding of the slopes subsequent to such removal. While it may never be possible to establish finally the comparative importance of the above points on the basis of actual construction, the fact remains that the work on the open canal has demonstrated beyond doubt that the overburden can be removed with no more difficulty than was anticipated and that the means orginally devised will hold the banks safely within the limits of the predetermined slopes.

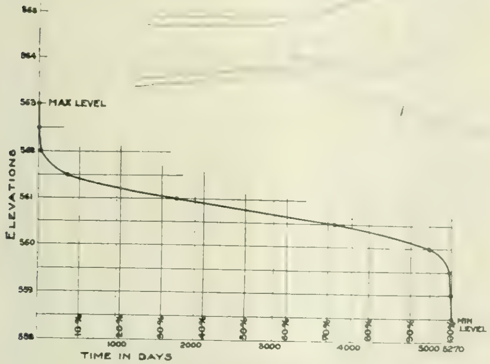


Fig. 1. Duration curve of water levels at Chippawa, 1902-16

Hydraulic Comparison

In the matter of purely hydraulic comparisons, the first point to consider is that both types of waterway would, of necessity, have the same point of intake at Chippawa and the same point of discharge at Queenston, so that they are exactly on a par as regards the utilization of available gross head, neither having any primary advantage over the other in this regard.

Since 1902 the water level at Chippawa has been observed and recorded twice daily. Fig. 1 shows the mean daily elevations for the ensuing period compiled in the form of a duration curve. The following facts are deducible from this curve.

(a) The mean level for the entire period is about elevation 560.8.

(b) A level of elevation 559.5 or higher is obtained for nearly 99 per cent. of the entire period.

(c) A level of elevation 561 or higher is obtained for a little more than one-third of the above period.

(d) It is reasonable to assume that the effective operating range of levels lies between elevations 559.5 and 561.

As to the possibility of the carrying capacity of either type of waterway being seriously affected by a permanent lowering of the natural levels of the Chippawa-Grass Island pool, due to present and future diversions of water therefrom, it is essential to consider two facts; first that any diversion for power purposes from the pool itself will be largely compensated for by the intercepting effect of the diversion works, and second, that the level of the pool can be controlled independently to compensate for any diversion whatever, whether from the pool itself, from the upper reaches of the river, or from Lake Erie direct.

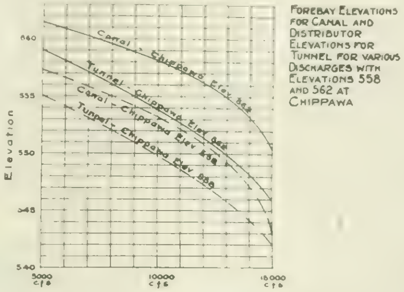


Fig. 2 Comparison of head losses chargeable to tunnel and canal waterways

Fig. 2 shows in graphic form a comparison of the head losses chargeable to each type of waterway under discussion. In making this comparison, a possible extreme low elevation of 558 has been assumed for head-water, and the open canal losses calculated on this basis for a carrying capacity of 15,000 sec. ft. On the basis of this loss a tunnel was designed of the requisite diameter for the same capacity of 15,000 sec. ft.

These curves have been computed for the extreme range of possible operating levels, elevations 558 minimum and 561 maximum. The shape of these two pairs of curves illustrates clearly the basic diffierence between the two types of waterway. Under the assumed conditions the tunnel and canal curves for the head-water elevation 558 and 15,000 sec.ft. discharge have a common point of origin. As the discharge drops off, however, it is seen that the canal delivers any fixed discharge to the forebay at a consistently higher elevation than in the case of the tunnel. This is simply due to the inherent characteristics of the two types of waterway. In the case of the pressure tunnel, the discharge area is necessarily constant and any gain in head is due to decreased friction only. In the case of the canal the reduction in velocity not only reduces the friction losses, but the retardation of flow increases the effective discharge area of the canal section. By reason of this extra factor, the open canal has an advantage over the tunnel ranging as high as 5 feet of head loss. When the high discharges involved in the pro-

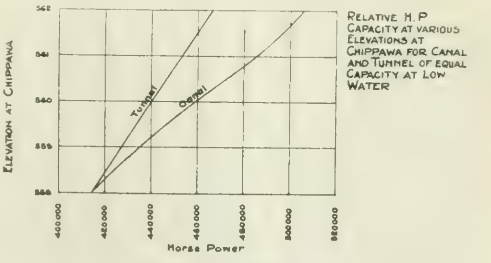
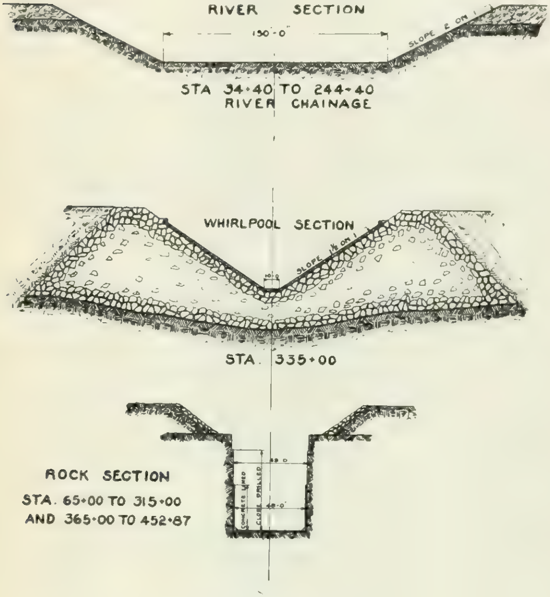


Fig. 3. Relative h.p. capacity at various elevations at Chippawa for canal and tunnel

blem are considered, it is evident that this difference in head loss is a very important factor.

The curves shown on Fig. 3 have been [illegible] on a different basis, but with the same factors involved. In Fig. 2 head-water level and carrying capacity have been assumed constant and forebay level the variable. In Fig. 3 head-water and forebay level are the constants and carrying capacity expressed in horsepower is the variable. In this latter curve forebay level is assumed constant at the fixed minimum elevation for peak load capacity and from this common point the comparative carrying capacities for the two types of waterway have been calculated for specified levels of head water in the Chippawa-Grass Island Pool.

The conclusions which may be drawn from a full discussion of all the factors involved are; first, that starting from the common basis of equal loss and carrying capacity at extreme minimum head-water level, the open canal will deliver the required quantity of water to the forebay with a materially less loss of head than the pressure tunnel, for any head-water level above the assumed absolute minimum; second, that starting from the common basis of a fixed minimum forebay level, the canal will deliver a constantly increasing quantity of power in proportion as the level of the head-water rises above the assumed extreme minimum level, which the pressure tunnel cannot do to any appreciable extent by reason of its inherent hydraulic characteristics; and finally, that the open canal is the only agency, under the above conditions, which can make automatically available the large quantities of excess power resulting from any temporary or permanent increase in the level of the Chippawa-Grass Island Pool, above the extreme minimum level which has been used as a basis of comparison.



Three typical canal sections

The above were the primary reasons which led to the final choice of the open canal for the connecting waterway between Queenston and Chippawa. This canal, consists of 4¼ miles of the improved natural channel of the Welland River near Montrose to the forebay site above Queenston. Besides being only about half the length of the alternative Jordan-Erie Canal, the average operating head for equal qualities of water carried is about six feet greater at Queenston than it would have been at Jordan Harbour, despite the fact that the elevation at the point of intake is about 9 feet lower and the elevation at the point of discharge about 2 feet higher than would have been the case with the Jordan project.

Another distinct advantage of the open canal is the fact it can effectively and inexpensively take advantage of any water which might now or in the future be available from the Welland Canal system. This open waterway would furthermore furnish the only means, in connection with the upper reaches of the Welland River of reclaiming the unused 9 feet of head in the Niagara River above Chippawa.

The Queenston-Chippawa development in its final form is a much larger installation than that contemplated in 1915, when under the exigencies of war conditions, it was proposed to construct a power development and canal with an initial capacity of only 100,000 horse power, and an ultimate capacity of 190,000 horse power at a cost for the initial development of $10,500,000—a figure, which it has been computed would have been raised to approximately $29,000,000, due to war prices prevailing during the years 1918, 1919, 1920 and 1921.

The Design of the Canal*

The canal is divided into four sections. The first of these is the Welland River section 21,000 feet in length, with a bottom slope 0.000119 and side slopes of 2 to 1. This was excavated by means of dipper dredge and cableway. The earth section which follows the river section is 6,250 feet long with a bottom slope of 0.0001208 and side slope 2 to 1. For each of these sections a roughness factor of .035 in Kutter's formula was used. The earth section of the canal was originally designed as a concrete lined section of much smaller cross-sectional area but a study of the economic, constructional and operating conditions indicated that the advantages of the larger section would be sufficient to compensate for the cost of the extra excavation. This portion of the canal has a capacity of over 15,000 c.f.s. with uniform flow at the assumed roughness factor of 0.035, and extreme low water in the Niagara River at Chippawa.

At the end of the earth section is located a transition, 300 feet long, in which the trapezoidal cross-section is changed to the rectangular rock section of 48 feet finished width with concrete sides and bottom. Beyond this are the control works, which are described later

The rock section proper is 36,252 feet long and is divided into two parts by the Whirlpool section which has a length including transition, of 2,450 feet. The water section of the rock portion of the canal has concrete lined sides and bottom with a finished width of 48 feet. The bottom slope is 0.0002113 and the roughness factor used in Kutter's formula 0.014. This value is conservative in view of the method of placing the concrete lining. With the steel forms that were used and the special provisions made for alignment of the forms, a smooth plane surface was obtained on the concrete facing.

For 27,000 feet the concrete lining is carried up 33.5 feet above the finished grade of the canal; for the next 9,000 feet the lining is 31 feet high and for the remainder 30 feet high, except in the Whirlpool Section where it is carried up to elevation 563.0 For the greater part of the time the water surface will be above the top of this concrete lining but the friction loss will be reduced by the lower velocities that will then exist in spite of the greater roughness of the unlined rock. Numerous hydraulic studies have been made to determine the surface slopes in the canal for various discharges and for various water levels in the Niagara River. In cases where the water surface was above the top of the concrete lining a composite roughness factor was used in which the proportions of the wetted perimeter on the lining and on the rock surface were taken into account. Roughness factors as high as 0.019 resulted in some of these instances.

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*T. H. Hogg, Assistant Hydraulic Engineer, Hydro-Electric Power Commission of Ontario

Determination of Depth and Slope

The depth and slope of the rock section were fixed by an economy study and the decision to use a concrete lining throughout its length was also reached in the same way. The method of arriving at the economic section of the canal will be explained later.

An examination of the profile of the canal indicates that the rock surface falls far below the grade of the canal about Sta. 333, rising again to grade about Sta. 349. This occurs in the Whirlpool Section, which is located at Bowman's Ravine or the Whirlpool Gully. Here it was necessary to carry the canal partly on fill and to use a trapezoidal cross-section on account of the foundation upon which the canal is carried. A concrete lining was essential on account of the high velocities. The bottom width is 10 feet and the side slopes 1½ to 1. The slope of the bottom is the same as that of the rock section, viz., 0.0002113.

The Whirlpool section of the canal was designed to have the same cross-sectional area at the lowest possible operating water level as that of the rectangular rock section. This minimum water level would be somewhat above elevation 542, which is the elevation of the curtain wall at the screen house. The area of the cross-section below elevation 542 is the same for both and for greater elevations the Whirlpool section has the greater area so that there is no danger of the canal capacity being "choked off" at this point.

In locating the Welland River section the river course was followed closely so as to take advantage of the area of the natural channel. This necessitated leaving in all the bends that occurred in the unimproved stream. As the deflection of these curves is not great they will not produce any appreciable loss.

The first important change in direction occurs at the beginning of the earth section at Montrose and is followed by a second bend at the Michigan Central Railroad crossing at Montrose. In addition to these there are only five changes of direction in the rock section of the canal, the deflections of which are 51, 27, 31, 33 and 46 degrees. The radius of curvature in every case is 300 feet and this radius is used for the inside and outside of the bend as well as for the centre line. That is, the curves of the two sides and the centre line of the canal are not concentric, resulting in a greater width of canal at the middle of the bend than at either end, the expectation being that the energy losses will be less than in a bend with concentric curves. It is probable that a shorter radius than 300 feet would give even better results, but this minimum was fixed by the size of the electric shovels that are being used for the excavation work.

The question of surges of the water surface in the canal, due to changes of load on the plant, is of great importance. This problem received an amount of study proportionate to its importance. The sides of the canal and the floor of the screen house are built to such an elevation that with the worst combination of conditions the water will always be contained within the sides of the canal.

Observations of river stage at Chippawa have been available since 1902 and show a minimum W. S. elevation of 558.5, which low stage was reached only on two days. An examination of the past records of Lake Erie stage indicate that as low a stage as 558.0 may be possible at Chippawa. This latter water level is therefore treated as extreme low water and the canal is designed to carry full load at this stage of the river.

While the low water conditions control the size and slopes of the canal, on the other hand the mean water conditions were assumed to be those on which the economic proportions should be based.

Design of Canal Section

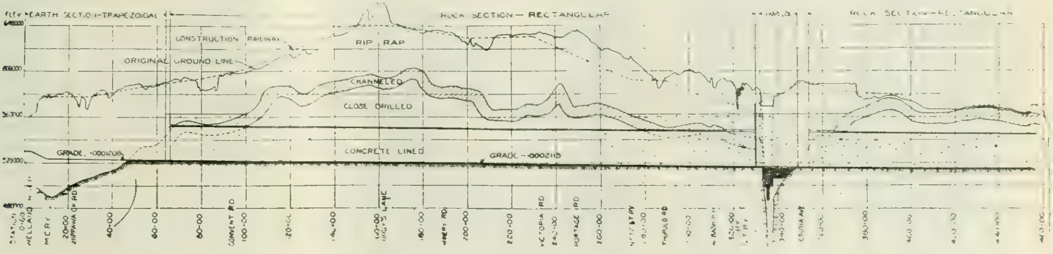
Certain limitations were met with at the outset. The Welland River section of the canal had to be maintained as a navigable stream, and as the excavation is in earth this portion of the canal was therefore designed for a low nonscouring velocity. The minimum width of the rock section was fixed by the type of electric shovel used for excavating this portion of the canal and was placed at 48 feet.

The problem thus resolved itself into selecting the best proportions for the trapezoidal earth section and the best depth and slope for the 48 foot rock section. The procedure in the latter case is the one that will be described.

It is, of course, possible to design any number of canals 48 feet wide, but with depth and slope varying so that all will give the same discharge at low water. For a low velocity the wetted cross-section must be deep but its slope may be moderate. For a high velocity the depth of the wetted cross-section will be small but the slope may be so great that the depth of the cut at the down-stream end may be greater and the total cost of excavating greater than for the low velocity design.

The procedure in determining the economic depth was as follows:

First, the design of a number of cross sections for vel-



Profile of Queenston-Chippawa power canal, exclusive of river section ocities of 3, 4, 5, etc., feet per second, the determination of the requisite slope of the bed in each case to give the full load discharge with uniform flow, and the determination of the variation in cost of these canals with low water velocity.

Second, the determination of the friction loss in each of these canals with the river stage at its mean value. This friction loss represented so much lost power, which was, of course, small in amount for the lesser low water velocities, and greater as the low water velocity increased up to a certain point.

Third, the plotting of the differential curves for items 1 and 2 thus showing the variation in delta cost with low water velocity and the variation in delta power with low water velocity. From these two differential curves a third curve can thus be obtained giving the value of delta-cost by delta-power plotted against low-water velocity. Thus there is obtained what will be called an economy curve, showing for any given low water velocity, the rate at which further gains in power may be made at any low water velocity by enlarging the canal slightly and so cutting down velocity and friction loss.

Fourth, the selection of the best low water velocity from this economy curve.

Economic Water Velocity

The gain in power which results from a slight enlargement of the canal comes as a result of the reduction in friction loss. The additional cost for power house equipment is so small, within the limits in which we are working that they can be neglected. It is reasonable then to continue the enlargement of the canal until the interest charges on the cost of excavation for the last horse power gained are equal to the average value of the power from the whole plant, including interest, depreciation, operation and maintenance. By stopping short of this point we would be in a position to gain more power at a cost less than the average that we were willing to pay for the power from the whole plant. It is interesting to note that the economic velocity determined in this way is but slightly larger than the minimum cost at which the canal could be built to get the required discharge at low water. The minimum cost occurs for a velocity somewhat greater than the economic velocity.

The advantage for this method of attack is that it permits an economic size to be selected for the canal without the inclusion in the estimate of the cost of anything that does not vary with the low water velocity. In this case, the width of the rock cut being fixed, the earth excavation does not vary with the various designs for the rock section and as a matter of fact in computing the cost of rock excavation only that below some assumed horizontal plane at a lower elevation than natural rock surface but above canal grade was considered.

Annual Toronto Convention A. M. E. U.

Many Important Matters Discussed and Reports Presented—Extension of Meter Seal Period to Ten Years, being Considered—Attendance almost 100 per cent of Membership

The Association of Municipal Electrical Utilities of Ontario held the regular annual conventon in Toronto, Chemistry & Mining Building, U. of T., on Thursday and Friday, January 26-27. Mr. M. J. McHenry, the president, was in the chair. The attendance, as is usual at this convention, was very complete throughout and the attention paid to the papers as read, and the discussion that followed, indicate the keen interest shown by the various municipal managers in the matters that come before these conventions.

The chairman's address was brief but much to the point. In effect, he spoke as follows:

Before we proceed with the routine business, gentlemen, there are one or two things which I should like to bring to your notice. Matters of great importance have arisen and have been dealt with by your executive, and I trust that the action taken will receive your approval.

Merchandising Electrical Appliances

The first of these matters is the merchandising of electrical appliances by the Hydro municipalities. At the suggestion of the Hydro Electric Power Commission, through the chief engineer, Mr. F. A. Gaby, a committee was appointed by the executive of this association to co-operate with the Hydro Electric Power Commission and consider the problems of merchandising. At the present time a certain number of our larger municipalities are merchandising electrical appliances, but the number doing so on any scale worth considering is very small. The problems confronting the smaller municipalities are very difficult to cope with, and it has been felt that closer co-operation in this respect would be a distinct advantage. Consequently this committee has been formed and already a considerable amount of work has been accomplished. We are not yet in a position to give you any details, because as a matter of fact the situation so far has been discussed only in a general way, but I hope that in the very near future every municipality will receive definite and detailed information.

Extension of Seal Period

Another matter taken up with which you are practically all acquainted by now was that of having the seal period of inspection of electrical meters extended from five to ten years. This matter has been taken up in conjunction with the Canadian Electrical Association and memorials have been prepared endorsing the extension. I think practically every municipality received a memorial for signature and return, and these memorials will be presented to the Department of Trade and Commerce at Ottawa.

In this connection memorials were received from all over the Dominion covering more than 75 per cent. of the meters now in use in this country. These memorials should have great weight at Ottawa and we are looking forward to having some action taken by that Department as the result of our efforts in this direction.

Central Electrical Organization

The third matter I can give you no definite information on as yet. Possibly many of you remember some months ago an editorial in the Electrical News with reference to the overlapping and lack of efficiency in our electrical organizations on account of each organization carrying on the same or very similar work in different sections, and therefore doing a large amount of work for itself which might very well be combined. The editorial suggested that something might be done to form a central electrical organization for the Dominion.

This matter has reached the stage where our executive has been asked to appoint a committee to meet with committees from the various other electrical organizations to consider whether such a central body could be formed and on what basis. A committee has been appointed by your executive, and I may tell you that a meeting is called for February 6th, in Montreal at which your committee and the committees from the Canadian Electrical Association and from all the other electrical organizations will meet to discuss this matter and report back to the executive and to you. So you may expect later on to have a definite report as to the possibilities of forming a central electrical organization and the basis of its formation.

Closer Co-Operation

Let me add this thought, gentlemen. What we need at the present time more than anything else is closer co-operation among all the municipalities forming this organization. A short time ago it was brought to my attention that one of the small municipalities did not care to join us because its representatives felt that it would get nothing out of membership. I think that was a mistake on the part of the municipality and was due to its people not understanding all of the conditions, for I think most of you will agree with me that everything has been done for the benefit of all municipalities and not for a certain group.

Nevertheless this incident shows that it is incumbant upon us to see that in future no municipality shall be able to say that it does not receive any benefit from membership in this association. The municipality I referred to claimed that the conventions were solely for the benefit of the larger municipalities in the association. We must always keep before our minds that we have all classes of municipalities in our membership, and therefore we must carry on our work for the benefit of all our members generally, and not for the benefit of any one group in particular. That means that we must co-operate to the fullest possible extent.

Committee on Regulations and Standards

By R. H. STARR

I received a complaint from one member relative to the expense of installing a separate switch on range installation. I communicated his complaint to Mr. Hall, chief inspector, and in his reply to me he stated that although the installation was recommended it was not insisted upon. This information I forwarded to the gentleman who had registered the complaint.

The executive meeting held last October authorized me to write Mr. Hall that owing to the different interpretation of rules and regulations by various inspectors it would be well to have a general meeting at least once a year for the discussion of the rules to insure their uniform application in the province.

Mr. Hall in reply stated that it was questionable whether the benefits to be derived would warrant the expense of bringing inspectors in for a general meeting, as a great many of them carry on their work single handed and their distance from Toronto would mean a day coming here and another day returning to their districts. However, he stated that before the next issue of the rules and regulations is ready for distribution it is just possible that a general meeting will be called. If this cannot be arranged, meetings will be held at the principal centres in various parts of the province.

Standardization of Oils

There is another matter I should like to bring before the convention. Along about Christmas the Electrical World had a very good editorial on the Standardization of Oils. This struck me as being such an excellent editorial that I wrote to the different manufacturers throughout Canada asking them for expressions of opinion in regard to it.

Where five or six different oils are handled there is liability of the lineman or foreman getting hold of coal oil or some other oil rather than the proper standard oil, and the consensus of opinion of the various manufacturers was that something should be done towards standardization, one manufacturer suggesting that the whole thing should be referred to Mr. R. J. Durley, secretary of the Engineering Standards Association at Ottawa.

In view of the importance of the subject I think this associaton ought to take action on the lines of this suggestion, and I should like to have an expression of opinion from the members present.

It was moved by Mr. Shearer, seconded by Mr. Yates, that the report of the Regulations and Standards Committee be adopted, and that the executive of the association be empowered to take up with the department at Ottawa the question of standardization of transformer oils.—Carried.

Twin City Electrical Exhibition

The secretary, Mr. S. R. A. Clement, reported that he received a letter from Mr. George O. Philip, manager of the Twin City Electrical Exhibition as follows:

"During the week of May 1st to 6th next, there will be an electrical exhibition held in Kitchener. This exhibition is being put on under the auspices of the local Electrical Contractors and Dealers Association and the Waterloo and Kitchener Light Commission. The exhibition promises to be a great success and will contain some new and unique features illustrating what can be done with electrical current.

[Concluded on page 49]

M. J. McHenry, re-elected President

A. T. Hicks, Vice-president

S. R. A. Clement, Secretary

BETTER MERCHANDISING

Sociability as an Aid to Co-operation—Little Speech-making and Much Fun Brings Montreal Fraternity Together

The use of the social element is a potent method of propaganda. Many men have little or no use for a lecture or an address, but a smoking concert, luncheon, or dinner is another matter. The prospect of a "good time" in this work-a-day world is not to be resisted. This was shown by the second smoker of the Electrical Co-operative Association of the Province of Quebec, held in the Rose Room, Windsor Hotel, on February 8, when about 500 attended, representing every branch of the industry. The arrangement of the hall was admirable. It consisted of small tables, each accommodating five or six people, with a head table, and a large table running down the centre of the room.

The speech making was brief and to the point. The key-note was co-operation. The chairman, Mr. L. I. McMahon of the Bell Telephone Company, introduced the speakers—K. B. Thornton, president of the Association, and K. A. McIntyre, Canadian representative of the Society for Electrical Development, New York. After welcoming the visitors, Mr. Thornton remarked upon the harmonizing of all sections of the industry, as shown that night—a thing which would have been considered impossible a few years ago. Now was the time to get together and boost the industry. He was of opinion that trade prospects had improved, but it was essential that they should co-operate in order to decide the maximum results. They must get together. Mr. Thornton's speech was very cordially received.

Mr. McIntyre pointed out that in co-operating they must have a definite object—something that was calculated to benefit everyone. In this connection he spoke of the Electrical Home to be shown in Montreal, with the principal idea of educating the public on better wiring. In Toronto an exhibition of this character had been a great success. In 13 days 19,555 had visited the home, each receiving a brief talk on electrical wiring. In order to attain success, it was necessary to have volunteers to do this work, and he appealed for help in this derection when the Montreal Home was opened. Every section of the industry would benefit—and here was an opportunity for practical co-operation.

In the course of the evening Mr. J. W. Pilcher spoke briefly on the subject of securing greater business by concerted action.

The arrangements were made by the following committee; Messrs. N. Richards, Northern Electric; Geo. Atchison, Southern Canada Power; A. L. Jones, Canadian General Electric; L. I. McMahon, Bell Telephone; E. S. M. McNab, C. P. R.; Jack Kavanagh, Northern Electric; W. McCarthy, Northern Electric; T. Chennell, Bell Telephone; W. Gibson, Canadian General Electric; J. A. Dick, Canadian General Electric; C. B. Sifton, Northern Electric.

The programme was varied and included songs, dramatic recitals, card tricks, and boxing, the latter by boys from the University Settlement. The following also contributed: Miss Thevenard, Miss Ryan, Joe Bochon, Jock Hunter and C. Cooper. Some impromptu fun was provided by Messrs Pilcher and Hiller. Mr. Bochon acted as leader in some community singing.

Electrical and other firms donated some eleven prizes, mainly domestic electrical appliances, which were drawn for.

The concert was a complete success, the attendance being even larger than was anticipated. There was apparent the spirit of co-operation which was so strongly emphasized by the speakers and which, in fact, was one of the main objects of the gathering.

Mr. E. H. Porte tells Hamilton Contractor-dealers about "Better Merchandising."

A meeting of the Hamilton District Electrical Association was held on Wednesday evening, February 1st, in the Board Room of the Y. M. C. A. Dinner was served at 6.30 p.m. to about thirty members. A report was received from the Legislation Committee on the Licensing Act for electrical contractors and dealers, which was adopted and carried unanimously. Formal approval of this Act has been forwarded to the secretary of the Ontario Association of Electrical Contractors and Dealers. Mr. James A. Daly, manager of the Northern Electric Co. at Hamilton, was called upon to introduce the speaker of the evening, Mr. E. H. Porte, manager Renfrew Electric Products Ltd. Mr. Porte gave a very interesting talk on merchandising of electrical equipment. He urged the necessity for more "system" in the average electrical contractor's business; better accounting; proper determination of selling prices; better merchandising methods, and everyone present benefitted to a large extent from the speaker's remarks. Mr. Norman Crawford of the Crawford Electric Co. moved a vote of thanks to the speaker for his very inspiring address; this motion was seconded by Mr. William Thornton. The members were also entertained by Mr. William Doerr of the Repeater Six Fuse Co., Burlington, who told many jovial stories of travel, and rendered songs that brought a hearty laugh from all present. The new executive have decided that in future the monthly meetings will be held in the Board Room of the Y. M. C. A., commencing with a dinner at 6.30p.m. At each meeting there will be a speaker who will address the members on various subjects of interest to all connected with the electrical industry. Mr. K. J. Donoghue is secretary-treasurer of the Hamilton Association.

Nesbitt Electric Manufacturing Co.

The Nesbitt Electric Manufacturing Co., Ltd., has been formed, with head office at 95 King Street East, Toronto, as successors to The Canadian Krantz Co., to manufacture and sell in Canada the well-known Krantz equipment, such as safety and live face switchboards, panel boards, switches, motor starters, etc. in fact, the complete line manufactured by the Krantz Works, Brooklyn, N.Y. The officers of the company are particularly well-known men in the trade. Mr. R. H. Nesbitt is president; Mr. A. Ross Oborne, vice-president, and Walter Warren, late manager of the Central Electric Supply Company, treasurer. In the hands of these men the trade may be assured of quality products in keeping with the Krantz reputation, backed by an excellent service.

Twenty Thousand Interested People Visited Toronto's Model Electric Home

Campaign for Educating the Public

In the Necessity for Adequately Wired Homes meets with Tremendous Success — Industry has Already Experienced a Decided Impetus Locally — Results will be Cumulative

It is too early to attempt to relate the whole story of the successs of the Toronto Electric Home campaign, but enough has been demonstrated in the first exhibit to indicate that the results will be very far reaching and will fully justify the trouble and expense in which the electrical men of Toronto have been involved. Though we cannot as yet speak entirely definitely of results, the story of the campaign is full of interest and to other cities that may be contemplating a similar movement, prove of benefit, in the way of a precedent for which there is altogether too little in our industry.

Like many other movements that have started from small beginnings, and developed as the objects became clearer and the obstacles were removed one by one, the Electric Home idea had its birth at a meeting of a few representative electrical men in Toronto who lunched together in the Board of Trade Building and discussed the necessity of doing something to arouse interest in the minds of the general public in electric wiring and electrical appliances and, at the same time, stimulate the flagging enthusiasm of the members of the industry themselves. At this little meeting it was decided to form an Electric Home League, and before the meeting broke up ways and means were discussed of financing the undertaking, the necessary committees that should be involved, the personnel of these committees and their duties throughout the campaign. Fortunately, through the helpful co-operation of the Society for Electrical Development, Mr. K. A. McIntyre, the Canadian representative of the Society, was placed at the disposal of the Electric Home League and matters were left very largely in his hands to arrange and develop. Mr. McIntyre has throughout practically acted as general manager, and the results obtained are the best testimonial of his untiring efficiency.

The committees formed included a Central Committee, which also functioned as a Finance Committee; a Publicity Committee; a House Committee; an Appliance Committee; a Wiring and Illumination Committee and last, but by no means least, a Results Committee.

Generally speaking, the Central Committee's duties were to co-ordinate the plans of the various other committees; receive and pass up on reports of these committees from time to time; offer suggestions and assist in every possible way in carrying on the work. The Finance Committee was delegated with the important duty of raising funds and keeping a watchful eye on the expenditures. The Publicity Committee had charge of advertising in the newspapers; publicity posters on the street cars; indicating cards on the distribution poles; electric signs; window cards for contractors and others; stickers for letters; literature to be handed to the visitors as they passed out; the selection of dignitaries to officiate at the official opening; keeping in touch with the publicity side of the daily press; providing speakers before this and that organization of men and women, etc.—anything that would bring the idea in a favorable light before a large number of citizens.

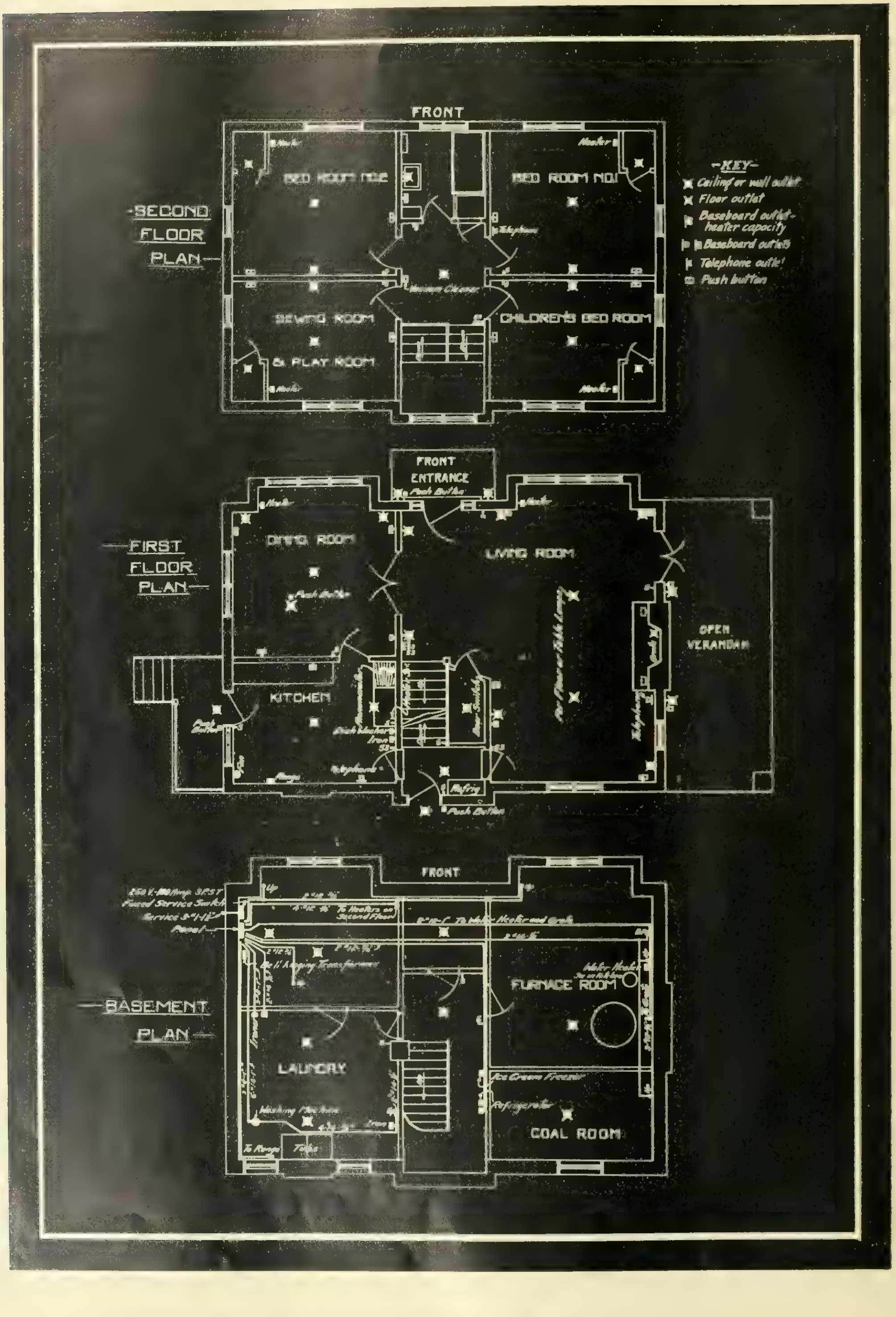
The House Committee had charge of the Home itself, after all the work of installation had been completed and the public began to arrive. No visitor was allowed to pass through the Home without carrying away a definite idea of the purpose of the campaign, every room having been visited and the cause and effect of the outlets having been explained.

The Appliance Committee secured the particular appliances that were shown in the Home and it was their business, also, to see that these appliances were on hand as required.

The Wiring & Illumination Committee, as its name implies, had charge of the rehabilitation of the wiring to bring it up to a standard in keeping with the demands of a real Electric Home. They also were responsible for the illumination of the various rooms.

The work of the Results Committee has just begun. It is their duty to see to it that the contractor and the merchant follow up the advantage provided by the exhibition in placing

The plans on the following page indicate the location and the number of the outlets in the Electric Home; the photos also do this to some extent although it will be noted that only corners of the rooms are shown and, in consequence, only a percentage of the outlets. In room "A", the living room, arrows indicate the approximate locations of a number of outlets including two under the mantel-shelf, a telephone outlet and the floor outlet for lighting. Room "B" shows two baseboard outlets, a telephone outlet, a reading bed lamp, etc. Room "C" is a corner in the kitchen, with the refrigerator showing through the open door in the hallway. Note the switch controlling the heater down in the furnace room. "D" is a corner of the dining room. Note the decorative wall fixture, the baseboard outlet and the outlet in the table. This table is equipped with a number of outlets. "E" shows the use of a wired tea table, where the ladies are using a toaster and tea urn. In "F" note the ceiling outlet, also the outlet for the iron and the arm controlling the cord. The ironing machine does not show in this picture. In "G" note the lighted closet: two outlets are indicated, through at least two more were supplied in this room. The central picture is a typical view, taken by flashlight as an auxiliary to the flood light. This indicates how the people streamed into this Home, hour after hour, throughout practically every afternoon and evening of the demonstration. For a number of the interior views we are indebted to G. R. Anderson, Professor of Illumination, University of Toronto


FRONT
SECOND FLOOR PLAN
BED ROOM NO.2
BED ROOM NO.1
Heater
Telephone
Vacuum Cleaner
SEWING ROOM & PLAY ROOM
CHILDREN'S BED ROOM
-KEY-
Ceiling or wall outlet
Floor outlet
Baseboard outlet-heater capacity
Baseboard outlets
Telephone outlet
Push button
FRONT ENTRANCE
Push Button
FIRST FLOOR PLAN
DINING ROOM
LIVING ROOM
Push Button
For Floor or Table Lamp
Telephone
OPEN VERANDAH
KITCHEN
Push Button
Dish Washer
Iron
Telephone
Range
Refrig
Door Switch
FRONT
250 V.-100 Amp. 3P.S.T. Fused Service Switch
Service 3-#1-1/2"
Panel
Up
To Heaters on Second Floor
To Water Heater and Grate
Bell Ringing Transformer
BASEMENT PLAN
Water Heater
FURNACE ROOM
LAUNDRY
Washing Machine
Iron
To Range
Tubs
Ice Cream Freezer
Refrigerator
COAL ROOM

the public in the frame of mind where they are interested in having more outlets and more appliances.

The actual operation of the various committees is covered in greater detail below:

The Finance Committee

A campaign of this kind cannot be run on sentiment or "best wishes" and the Electric Home League had no false ideas on this point. The very first activity of the Central Committee was to prepare a schedule of costs, considering in detail the various items that must enter into the expense, allowing a fair amount for contingencies. In a city the size of Toronto it seemed necessary that more than one Home should be shown, and so it was decided, in a general way, that the first Home should be centrally located in a section of the city which represented approximately one-quarter of the population. Within the next few months three other Homes will be shown at intervals of one month or six weeks, or thereabouts, where the other sections of the city will be brought more closely in touch with the idea. So far could be judged by a careful study of the knowns and unknowns in this campaign the sum of $13,000 was the amount necessary, and this money it was proposed to raise approximately the following way: the Toronto Hydro Electric System was asked for and contributed -$5,000; the manufacturers and jobbers together are contributing $3,000; the contractor-dealers have been asked for $3,000 and the real estate firms, of which four will be interested before the campaign is completed, are expected to contribute at least $2,000. While the whole of this sum has not yet been assured, splendid progress is being made and there is every indication that each section of the industry will do the part that is required of it.

The Publicity Committee

It goes without saying that a very large percentage of the total expenditure is incurred in newspaper advertising, and of the total sum used for this purpose the proportion required to stimulate interest in the first Home is necessarily much greater than will be required for the others. A scheme was very carefully worked out, by which the interest was stimulated before the Home was opened, but, after the public were fully advised, the expenditure was curtailed—the announcements being much smaller. This has been found to work out very satisfactorily. For the second Home it will not be necessary to spend so much money to get the public interested and by the time the last Home is put on exhibition it is expected the public will be looking for it, rather than having to be coaxed to read about it. Mere announcement will thus serve the purpose.

Street car publicity, in the way of posters on the front of the cars, proved very effective. "This car to the Electric Home, Oakwood & Regal Road" was shown daily on all cars passing in the vicinity of the Home. Stiff cardboard signs reading "To the Electric Home," with finger pointing, were installed at a height of about eight feet on all main streets leading to the Home. Hundreds of these signs were used, the Hydro poles being utilized for the purpose. A limited number of electric signs were also used.

TO THE
ELECTRIC HOME

The Electric Home was quite prominently located on a corner lot, the house itself being placed well back from the street, with a high terrace intervening. For this reason it lent itself admirably to flood lighting, and one of the illustrations shows what a striking effect caught the eye of the visitor as the Home first came into view. The roof of a house on the opposite side of the street served to carry two powerful flood lights, which illuminated the Home, the sign and the long string of visitors who patiently waited—some of them for hours—to get a peep at this fairy home.

Of very great importance, in the way of popularizing and advertising the Electric Home, were the addresses given by various members of the Publicity Committee, and others, before organizations of every kind. For example, the matter was explained by five or ten minute talks at regular meetings of the Electric Club of Toronto; the Rotary Club; the Canadian Club; the Kiwanis Club; the Women's Canadian Club and business men's and women's organizations throughout the city. As an example of the care taken to reach the right kind of people, one may mention the choice of Mrs. Bruce, president of the Women's Canadian Club, to officially open the Electric Home. Mrs. Bruce was so pleased and enthused that she carried this enthusiasm back to her own organization, thus reaching thousands of the best homes in Toronto by a direct appeal. This is merely an example of the efficient way in which the Publicity Committee functioned to popularize the Electric Home in the minds of the people who were best suited to avail themselves of its advantages.

THIS CAR
TO THE
ELECTRIC
HOME
OAKWOOD & REGAL RD.

Nor was it necessary only to enthuse the general public. As with all new movements, electrical men themselves were somewhat slow about throwing up their hats, and it was thought advisable to hold a general meeting to which all members of the electrical industry were invited. This brought together some 200 or 250 of the livest men in the trade, where they were fully advised of the activities of the League and the possibilities underlying them. The program at this gathering was most unique, one of the items, for example, being a dialogue between a householder—a sharp business man—and two contractors, one of whom represented the ideal of a "cheap" job, the other the ideal of a "good" job. The amusing result was that a contract, previously let for some $80 after the "cheap" contractor had urged his customer to cut out a number of necessary switches and outlets, was cancelled and given to the second contractor, who sold his customer a $700 job. Following this meeting, interest in the campaign was much more general and enthusiastic, and the Central Committee received a much wider co-operation.

These are typical instances of the work of the Publicity Committee, to whom due credit must be given for the popularizing of the whole movement.

The Wiring Committee

When the League took over the control of the Home its construction had just been completed and it was still on the market. As might be expected, it was not properly wired, and the first duty of this committee was to attend to this matter. The wiring of the Home, in the first instance, must have represented about 1 per cent. of its total cost; when the committee had finished with it, the wiring would represent about 5 per cent. of the total.

Plans and specifications were prepared by a firm that specializes in that work, and the wiring of the Home was let to a reliable contractor. This particular contractor was determined by lot, the members in the district all having an equal chance. On account of the short time at the disposal of the League, this work was done on a cost plus basis, the real estate dealer being assured that it would not exceed a certain amount. The owner, of course, paid for this work. During the installation the Wiring Committee constantly inspected the work and, by the evening of the day before the official opening, everything was complete; the house was well equipped with single and duplex outlets, switches and lights and the capacity of the service in every case was sufficient to take care of any demand that would be made upon it.

The Plans

The plan of the Home is shown herewith and the outlets are indicated. It will be seen that there was nothing faddish about the installation—nothing unnecessary. In every room one outlet was wired heavy enough for a heater service and the word ''Heater'' was printed in prominent letters across the plate. A number of the outlets were duplex. It will be seen that the living room has no ceiling outlets. The wall lights were intended for decorative effect chiefly, the real lighting being furnished by semi-indirect floor lamps fed from a floor outlet suitably placed. The house was wired for telephone service, two outlets being supplied—one upstairs and one down—so that the same telephone could be plugged in and used either in the living room or at the bedside in the main bedroom. This service might have been extended, but the committee considered in all points the advisability of not overdoing anything—not letting the average man or woman go away with the idea that this was something beyond their reach.

The appliances in the living room included a wired tea wagon, upon which was demonstrated the use of two appliances such as a toaster and a tea urn; an electrically operated phonograph; a fan; an electric grate; an electrically operated player piano, etc. Another feature of this room was the light in the coat closet operated by an automatic switch as the door opened and closed.

Followed a System

Nothing helped so much in making the exhibition a success as the system followed in keeping the different parties, or groups, together and in a certain fixed order. With people clamoring for admittance the greater part of the day, it was found necessary to limit the time taken by each demonstrator to three minutes, and groups of ten were thus admitted and expelled just that often. As a group of ten entered it was directed according to a predetermined plan. The first demonstrator explained in a few words the general object of the exhibit, emphasizing, not the appliances, but the wiring of this Home and illustrating his remarks later by a display of the various outlets in the room. This consumed from nine to twelve minutes and in the meantime two or three other groups of ten had been admitted and placed in charge of other demonstrators. It was found necessary sometimes to keep as many as five or six demonstrators in the living room at the same time.

100 Per Cent. Load-Factor

In each room in the basement, in the kitchen, the dining room and in each of the four rooms upstairs it was found necessary the greater part of the day to keep an attendant in charge. At the busiest times it was also necessary to have three or four ''traffic'' men [illegible] it was [illegible] the various parties kept together and followed their proper course. This was absolutely necessary for, difficult as it may be to one who was not present to realize the extent of the crowding, it was a fact that from early [illegible] each day the Electric Home was working absolutely on a 100 per cent. load-factor basis and the only reason more people were not shown through was that the capacity of the house was not greater.

The plan of any Home must regulate the proper course for the visitors to take, but in this case, after leaving the living room they moved downstairs past the electric refrigerator into the furnace room where the electric water heater was operating, then into the switch room where the advantages of a properly equipped safety board were shown; from there into the laundry with its washing machine, fed from an outlet conveniently and safely placed in the ceiling, its ample wiring capacity—in conduit—for heating the electric ironing machine and operating the motor, the auxiliary sad electric iron with indicating lamp attachment, all properly illuminated. From here the course led to the kitchen, the centre of interest to most of the ladies, wired for a range; an outlet for buffer or polisher, coffee grinder, etc.; dish washing machine, all connected up to the hot water system and sewer, etc. The kitchen was also supplied with a wall telephone. In the kitchen, also, was a switch controlling the water heater down in the furnace room; some specially effective lighting and, of course, the centre of the annunciator system throughout the house.

The Wired Dining Room Table

In the dining room, amply supplied with baseboard outlets, the feature of greatest interest was the wired dining room table. A floor outlet of ample capacity supplied four outlets in the table. The energy was led by a flexible cord up the middle leg of the table where, through a suitable junction box, it was distributed through flexible conduit to different points of the table. The visitors were particularly interested in the utility and luxury of this feature and were convinced of its practicability by the demonstrators themselves, many of whom had experienced the value of wired tables in their homes over a period of years. From the dining room, visitors were shown upstairs, convenient switching arrangements being explained as they passed along first to the play room, which was also called a sewing room.

And then on to three bedrooms; there was of necessity a certain amount of sameness in these four rooms, but the main point was kept in mind througout—the necessity for having a sufficient number of outlets for illumination, heaters, warming pads, reading lamps, telephones, hair dryers, vibrators, milk warmers, etc. etc. In this Home the bathroom was, unfortunately, so small that it was not possible to allow people to inspect it.

The stream of visitors was finally directed downstairs and out of the front door, an endeavor being made in every case to answer any questions by the way or pass a pleasant remark along the line such as—''Be sure to have wires heavy enough, and plenty of outlets,'' and the answer, invariably, was ''We surely shall''; ''We'll do our best,'' etc.

As a final send-off each visitor was presented with a descriptive booklet showing the plan of the house and the various outlets, giving a quantity of general information and on the back page a list of all the contractor-dealers who had shown an interest in the enterprise by becoming members of the Electric Home League. During the period some 15,000 of these booklets were carried away.

The Signal System

Among the items of special interest may be mentioned the signal system for control of the groups, devised by Mr. McIntyre. Buzzers were installed throughout the Home with a control in the lower hall. At this point a man was constantly stationed, watch in hand. At the end of two and a half minutes

A [illegible] signal indicated to the demonstrators [illegible] that they had one-half minute longer to finish their story [illegible] the people on their way. A second signal at the end of the full three minutes saw each group pass in an orderly manner to its next position, to be followed automatically by the next group. As a result of this systematic control it is probably safe to say that twice as many people saw the Home, and those who did see it obtained many times more information than they would have obtained, had they been allowed to pass through the building in less systematic manner.

The Number Who Attended

As has been already intimated, the house was full to capacity during a large part of the afternoon and the whole of the evening on each of the thirteen days the Home was open. Beginning at 10.00 o'clock in the morning, the house remained open until 10.00 o'clock at night, a period of twelve hours. Giving each group three minutes, it is evident that twenty groups could be passed through in an hour, i.e., 200 people: in 12 hours, 2,400 people. As a matter of actual fact, the number of counted visitors each day averaged 1,508, so that the load-factor for the whole twelve hours of the thirteen days averaged well over 60 per cent.

Results

It is too early yet to expect definite evidence of results, but one contractor-dealer in the vicinity, before the end of the first week of the campaign, volunteered the information that fourteen different people had made a definite request to him to come up to their homes and advise them regarding the installation of more outlets, like some they had "seen in the Electric Home." Evidence of so definite a nature is surely proof positive of the value of the scheme. Another feature that was quite noticeable throughout the campaign was the sympathetic attitude of the daily press. That, of course, might be expected in view of the fact that a considerable amount of money was being paid them for advertising, but, quite aside from that, the nature of the exhibit caught the fancy and appealed to the intelligence of the women on the reporter staff, with the result that the objects of the exhibit were explained in a very logical way. This, by the way, was another activity of the Publicity Committee, of which mention was omitted in its proper place, namely, arranging for a visit of the lady reporters of the daily papers to the Home.

Space does not permit naming the demonstrators, who gave liberally of their valuable time to conduct the people through this Home. Men high up in the industry considered it a pleasure to take their share of this work, and consulting engineers, manufacturers, wholesalers, contractors and dealers alike lent their co-operation by being present in person and experienced the exhiliaration of listening to the expressions of pleasure and appreciation of the general public as the various matters were brought to their attention.

The Appliances

The Home was completely decorated throughout and furnished by the T. Eaton Company. This furnishing did not include any electrical equipment whatever. All apparatus and appliances were supplied by the manufacturers or wholesalers. The particular firms asked to supply these were chosen by lot. For example, if there were a dozen firms manufacturing electric irons, these names were first given numbers; the numbers were then written on cards that were later shuffled and placed face downward. The order in which the cards were drawn then indicated the order in which the manufacturers would be asked to supply irons. If the first one were unwilling or for any reason unable to do so, No. 2 was given the choice, and so on.

A particularly important feature in connection with the display of appliances was the removal of all marks of identification. Name plates were either removed or covered up in such a way that the general public could not read them, and the demonstrators were asked to explain, in case of inquiry, that the pieces of apparatus simply represented types and that the various makes could be seen at any of the stores of the contractor-dealers whose names appeared on the back of the folder distributed to them as they would pass out. This procedure was followed so that no one manufacturer would gain any undue advantage over another. No one was expected to advertise any particular type of equipment, any advertising or publicity carried on during the period being concentrated on selling the people the "idea" of electric outlets in ample quantity and capacity.

The selection of these appliances, as a further safeguard, was placed entirely in the hands of a consulting engineer, in whom the industry recognized an absolutely impartial arbiter.

"Cashing In"

This, briefly, concludes the story of Toronto's first Electric Home. Whether or not the full value of the effort is realized depends very largely on the contractor-dealers themselves. This exhibit has created in some 20,000 people a sympathetic, inquiring attitude of mind towards the better wiring of their homes. Without doubt, hundreds of these will be aggressive enough to approach their contractor-dealer, but there are hundreds and, doubtless, thousands, of others who will wait to be approached. This, then, is the contractor-dealer's opportunity. He should see that every home in his district is personally canvassed by a salesman who knows his business—either by telephone or by a personal call at the door. A cheerful "Good morning, Mrs. Brown; I expect you were one of the 20,000 that visited our Electric Home" will be sufficient introduction in numberless homes to gain ready access and the privilege of suggesting an outlet here and there, and later the supply of equipment for those outlets. It is a golden opportunity, indeed, for the contractor and the dealer which, indirectly, will be reflected in the added orders that reach the central station, the manufacturer and the wholesaler.

Work of Wiring Committee

The Wiring Committee of the N. E. L. A. recently made the following report:—

The standardizing of attachment plugs and receptacles having been completed the Committee has been working on advertising this fact.

The Committee is working on standardizing medium size plugs and receptacles for large heater ranges, small motors, etc.

Also on the standardization of the appliance plug, where the cord connects to the flat-iron or other device.

The Committee is pushing the idea that there is a great difference in durability between the various heater and other cords on the market and that the average quality can be brought up by tests of different brands.

The Committee is endeavoring to get changes in the code to prevent the solid neutral, i. e., the omission of fuses on all grounded wire. Also to simplify and improve the so-called 660 watt rule.

Also to discourage the requirement of larger mains inside the buildings than the sizes which the central station experience with diversity factors shows to be safe.

Also to provide machinery to relieve the present situation whereby nothing is put in the code until tried in the field and whereby nothing may be tried in the field until after it has been put in the code.

The Committee is studying the best means for selling wire to the extent that this differs from selling electricity.

The Committee is developing the policy that the so-called electric fire loss can be dealt with by devoting special attention to each particular cause as flat-irons, over-fusing, poor portable cord, etc., rather than lumping all electrical fires including light, static, electricity, etc., together.

Your Credit Standing Five Years Hence?

A Few Outspoken Suggestions for the Electrical Merchant—If You Don't Cash in, Your Opponent Will

By C. D. HENDERSON*

Will your business, five years from to-day, be referred to as a sound, successful institution, or will you be struggling along working night and day in order to keep a few paces ahead of the sheriff?

It is entirely up to you!

To my mind the electrical business offers better opportunities right to-day than any other line of business. Every place you go you hear people discussing electricity. Governments and financiers are backing water power projects; railway companies are electrifying their lines; house owners are realizing the comfort and convenience electricity will bring them, and almost daily some new way is found to utilize this mysterious power.

The electrical contractor-dealer is the connecting link between the user and the producer, and his success from every angle will be in proportion to the manner in which he conducts his business. He is the logical outlet for the distribution of electrical goods, but it will not come to him by divine right. He must put forth every effort at his command or be swept aside by those in other lines of business eager to cash in on the millions of dollars that will be spent in this potential market.

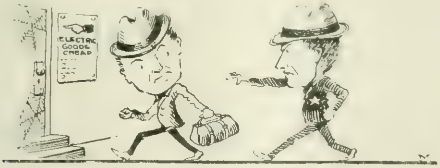
"Now" is the time to act. Not "When business comes back"—but right now when you have a little time to study the situation and put your house in order. Otherwise you will wake up some morning to find that the electrical business is gradually slipping away into other channels.

It is not necessary to learn everything by bitter experience. You know, without trying it, that if you jump into the river you'll get wet; or if you have a dollar and spend 20 cents you will have 80, not 90, cents left. These things have been proven conclusively; and so have certain fundamental principles of business which should form the foundation on which your business and mine may prosper.

Let us review some of the important features of business success applied to the electrical contractor-dealer:

Profit

This should be the first and last word in your business vocabulary. It stands out head and shoulders above everything else; it is the exact measure of business success, or you might say, it is your score in the game of business. Therefore, start now with this motto: "No article shall leave my place of business unless I know for a fact that it will produce a reasonable profit above overhead expenses."



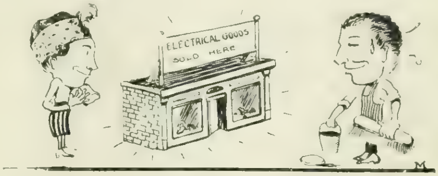
Just a few paces ahead of the sheriff

Overhead Expense

This is too big a subject and too important, to discuss fully in this article, and I have covered it fairly well in previous articles. Therefore, I will simply recall that from all facts, figures and experiences during the past few years overhead expense in the electrical retail business is not less than 25 per cent. on sales, which is the same as 33 1/3 per cent. on cost. Keep an accurate list of all items of overhead expense so that you will know just what it is costing you every week to conduct your business. Don't estimate these figures—get the facts. Facts are the pulse of your business.

Place of Business

In choosing a place of business remember—where there are crowds there is business—so locate as near the shopping centre as your capital will permit. Of course, you cannot compete with Woolworths for the choice sites; your class of business will not permit it, but don't be too saving on this point. It is quite easy to make up an extra $20 or $30 for rent in increased profits with a good location.



Make your place of business attractive to the femine taste

Appearance of Store

During the next few years most of your dealings will be with the womenfolk because the greatest advances in electricity will be confined to the home. This being the case, it behooves you to make your place of business attractive to the feminine taste. Always keep your store clean and neat, with your goods tastefully arranged so that the best class of women in your city will not hesitate to come in and look around. Learn from the experience of the big department stores that spend thousands of dollars to induce the women to feel at home in every part of the establishment.

Merchandise

You cannot give too much thought and attention to choosing the different lines you are to handle. Don't allow price to be the deciding factor, bear in mind that most people are willing to pay a little more for articles of merit. This is particularly true regarding electrical goods, in view of the fact that they are not being replaced every year as is the case with other classes of merchandise.

Confine yourself to a few well-known, firmly-established makes, rather than attempt to carry a little bit of everything—which is not only confusing to the customer, but to the salesmen as well. Furthermore, the fewer the lines, the less investment, overhead expense and service trouble.

Employees

You and your business will be judged by the class of people you employ. Impress this on the minds of each and every one of them from the apprentice up to the manager. Make them feel they are part and parcel of your business and that every act of theirs will re-act either favorably or unfavorably. Develop a spirit of co-operation and responsibility, and even a little competition within the organization will do no harm. Eliminate the words "boss," "weekly wage" and other relics of old-fashioned days, and in its place try to develop a spirit of family compact.

Advertising

A lot of money can be wasted in a haphazard method of advertising. Yet a little thought and attention to this im port[illegible] matter will pay big dividends. To [illegible] your show window can be made your best paying advertisement at very little expense. Place some one in your establishment in charge of this work and insist that your window be changed once or twice a week. As often as possible get something in motion in your window. This attracts attention, and when you get attention you get the opportunity to tell your story, and this is half the sale.

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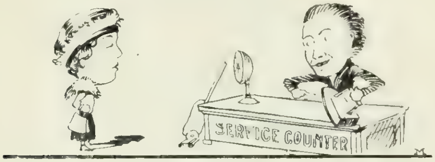
*By President Henderson, Business Service, Ltd., and Canadian Manager A. B. C. Co., Brantford, Ont.

Bookkeeping

No business should attempt to operate 24 hours without an accurate, simple set of books that will tell the owner each week or month just how he stands. A couple of hundred dollars spent for a good system at the outset will save its cost many times in succeeding years. A good bookkeeping system is the business man's compass; it leads him through the rocks and over the stormy seas into the calm waters of success.

Service

Remember that "service" is a very important feature in connection with 90 per cent. of your transactions, and it can be made a curse or a blessing. People buy electrical goods with the idea that they will give years of lasting satisfaction, and so they should if properly sold and explained at the time of the sale; but repairs are necessary at times and by giving your customers quick and efficient service, you cement the bond of friendship and satisfaction. After selling a vacuum cleaner and seeing to it that the customer receives the proper service, your sales resistance is lessened for the sale of a washing machine, an electric range and other appliances. But don't overdo this thing called "service," or it will become a burden. I believe that during the first year after a sale is made every reasonable service call should be given free; after that make your service department stand on its own feet and produce a profit and you will find most people quite willing to pay. But **give them service!**



But—give them service

Records of Sales

By all means keep a record of the sale of each appliance sold, the make, style, serial number and other information about the article itself; also the name and address of purchaser and date of purchase. Of course, this need not apply to the very small appliances. These records will be found a wonderful help from many standpoints. They will enable you to settle disputes; will be found helpful for references to satisfied customers and also act as a sales record of any particular line.

Sales Plans

Prepare a card index system of prospective purchasers of electrical goods, but prepare it—go through your books—the telephone directory—the lighting company's lists—and make a record of the people whom you know should buy and are able to do so. With this list made up and kept corrected you have something definite to work on. The manufacturers that you buy from will gladly supply you with circulars, letters, etc., to create the desire in these prospects' minds.

But this alone will not sell goods. You must follow it up with personal calls and arrange for demonstrations. Remember we are in a buyers' market and goods must be sold. The [illegible] past.

Procure the services of a neat-appearing, well-mannered young man with an inclination towards selling. Teach him all you can about your different appliances and, if possible, send him to the different factories for further training—then turn him loose on your prospect list. Do not make the fatal mistake of using this man for different odd jobs, or he will never make a successful salesman. There is plenty of work for him 10 hours a day on sales work that will produce big profits for you if properly handled.

This covers a few important features relative to the successful operation of an electrical contracting business. Analyze them—study them and talk to some of your competitors who are making headway. Then convince yourself you are in the best business in the world and resolve here and now that you are going to make a success of it.

Mr. Pope, Manufacturers' Agent

Mr. Macauley Pope, son of Major W. W. Pope, secretary of the Hydro-electric Power Commission of Ontario, has established himself as manufacturers' agent at 166 Bay St., Toronto. At the present time Mr. Pope is representing Campbell & Isherwood, of Liverpool, Eng., manufacturers of electric drills; Fuller's United Electric Works, Ltd., London, Eng., manufacturers of batteries, cables, etc., and the Engineering & Lighting Equipment Co., Ltd., of London, Eng., manufacturers of an extensive line of lighting fixtures and fittings. A novel feature being shown by Mr. Pope is the "Anti-break" lamp economizer, designed to overcome the problem of vibration and shock. This economizer consists of a plurality of strips of phospher bronze gauze cut and assembled in such a way as to damp out the waves of vibration before they reach the fragile filament. This economizer has been thoroughly tested out and is said to have proven efficient in engine rooms, over propellers on board ships, as well as under vibration set up by a pneumatic hammer on steel plates to which the fittings were attached. The device has even been subjected to tests on board naval vessels, where all the lamps not fitted were broken, the only lamps left to light the compartments being the ones fitted with "Anti-break."

Result of Hoover Contests

The Hoover Suction Sweeper Company of Canada, through their general offices at Hamilton, Ont., announce the results of the two contests in the Fall of 1921. The prize to the leading district manager in Canada, was awarded on points, given for sales to dealer, newspaper advertising (depending on the circulation of the paper in which the advertisment appeared), and for sales to users, and was awarded to H. M. Potticary, district manager at Montreal. There were 6 prizes offered to resalemen, based on sales of sweepers and complete stes of attachments, and the prizes were awarded as follows:— 1st-R. N. E. Connor, Robert Simpson Co., Toronto; 2nd J. M. Murray, Public Utilities Commission, London, Ont; 3rd-H. L. Husel, Hudson's Bay Company, Edmonton, Alta; 4th-C. R. Robinson, Toronto Hydro Elec. System, Toronto; 5th-P. T. Brinsmead, R. H. Williams & Sons, Regina, Sask; 6th C. E. Lillie, Toronto Hydro-electric System, Toronto.

Mr. Herbert Smith, secretary to Commissioner Lowry of the Manitoba Telephone System, was married on the fourth of January to Miss A. K. Cleverly, late of Sussex, England, the ceremony taking place at St. Lukes Church, Winnipeg. To show the high esteem in which Mr. Smith is held by his associates, the heads of departments and chief clerks presented him with a complete set of silverware; he was also the recipient of a cut glass water set from the staff.

The Merchandising of Electrical Appliances

The First Step is to Create, in the Public Mind, the Desire for Electric Goods — Just as Possible, Just as Easy, to sell at a Price that Will Yield a Proper Profit

By W. W. FREEMAN

President Society for Electrical Development, before Electrical Supply Jobbers Association at Cleveland

I have heard it said that there are central station people who seem to think that the jobber is a peculiar species, one that must be regarded tolerantly, but not taken too seriously, and I have heard it said by representatives of the jobbers that the central station people might be similarly described. In other words, there seems to be an impression in some quarters that we are two different breeds of cats. I haven't felt that way myself, and I feel that way less and less the more I mingle with the other elements in our industry. I have given up, if I ever held it I don't think I did—the thought that we can expect to agree, to have our minds meet absolutely with regard to the policies and issues that are of importance to each of us in our own operations. I don't believe we should agree if we have a diversity of interests, but there are many things upon which we can agree as to what is for the best interests of all. I believe that the successful jobber is successful because he practices the same intelligence and the same perseverance in his business as is exercised by the successful central station man. He differs from the central station man in some of his views, not because he is more intelligent or less intelligent, or more fair or less fair, but just because he is a jobber and the central station man differs from him just because he is a central station man. We must, necessarily, continue to disagree in regard to some things. The interests are not identical all along the line, and the man who is successful will sincerely follow the line of his own interest as he sees it.

In the large proportion of activities in which we are engaged we can agree, and we can work in the closest harmony and with the greatest enthusiasm, and the reason why I believe in the Society for Electrical Development, if I may refer to that for a few minutes, is because I know of no other basis that is at the present time available for a combination of actions and a combination of effort that should serve in equal degree to benefit the interest of each of the elements that can combine. You work together upon your problems, as you should; we work together upon our problems, as we should. But there are other problems which are of a mutual character, and other work to be performed in which we must join hands if we are to get the best results, and the purpose of this organization is to afford the vehicle for such action.

I submit to you that, irrespective of anything that this Society has undertaken to do in the past, or may undertake to do, the fact that it brings together a board of directors of twenty-five men, representing equally the diversified interests in the electrical industry, should, in itself, prove the value of the organization, because the opportunity, in itself, for you to send into such a Board of Directors four representatives of your branch of the industry who have free and full opportuity to present your problems as you see them, as affecting the problems of others, and to work in co-operation with the representatives of the other interests in formulating a program of general benefit, that I think in itself should carry convictions as to the value and the possibilities of such an organization.

One of the things that I like to think about, as opportunity affords, which is an inspiration to me, and I believe to all, is the progress that has been made in this industry of ours in its relatively brief period. The whole progress of the electrical industry is within the memory of many who are within this room. I don't wish to mention names, but if you doubt that I will tell you some of them, proving my statement. The pioneers in each of the branches of the electrical industry, electric lighting and power, and telephone, the street railway, are in strong and vigorous health, and in active work to-day. It is very new, and yet notwithstanding that fact it ranks to-day high up in the matter of accomplishment, investment, and in earnings with the very biggest industries of the country. Compare it with the gas industry, one hundred or more years old, and yet there are only three or four thousand gas companies in the United States, compared with fourteen thousand central stations or electrical companies manufacturing electric current.

I have some figures furnished by the Society just bearing on the relative importance of our industry in relationship to others which I think are startling to those who have not realized this relationship.

A Very Heavy Investment

In the first place, the total investment in the electrical industry to-day—and in that I include manufacturing companies, the central stations, the telephone service, street railway service—is over seventeen billion dollars, and the revenue, in one year, is over four billion dollars.

Now that compares with the other large industries of the country—steam railways rank first, according to statistical information, and yet the total earnings and value of the product supplied during the year is only six billion, two hundred million dollars.

Second in volume is the slaughtering and animal products, which is five billion dollars.

The third, and tied with the electrical industry, is the petroleum industry, which has an annual income of four billion dollars, so, as a matter of fact, in this brief experience the electrical industry ranks third in all the industries of this country in the matter of the annual sale, the value of the products of the industry.

In presenting that to you I have another thought in mind, not one of mere congratulation. It is a record of which we all have a right to be proud. It should be regarded, however, principally in the light of pointing out the possibilities of the future rather than of singing our song as to what has been done in the past. The greater proportion of the results of the forty years of the industry have been realized in the last decade. What has been done in forty years can be duplicated in the next fifteen or twenty years, readily, if we fulfill all the possibilities. In these forty years of experience there have been wired about seven million houses for electric service. That is a very large figure. But in half that time Henry Ford designed a flivver, and, through the operation of one company, has sold five million autos. I can't conceive that, in contrast with the relative importance of having electricity in the home, and of having an auto, even if we can afford autos, that the auto would win out, yet here is one organization that in half the space of time has done more in the way of relative accomplishment than the entire electrical industry with regard to getting electric service into homes throughout the country. I cite that because that [illegible] that I think justifies [illegible] and the [illegible] of you men.

Creating the Desire

What was done to sell the auto, what [illegible] for success, ultimate success, in selling the auto, was the **creation of the desire in the public mind** for the auto. It wasn't done through individual salesmanship as much as it was done through creating a wave of thought throughout the country, deep down into the consciousness of every individual, and the demand for these autos flowed in upon the agency and the autos flowed out, and were sold. The electrical industry, in my judgment, can be advanced more rapidly than in any other way by the creation of this wave of thought, and it has begun, and it has reacted very encouragingly up to date, but by no means to the extent that is possible.

Now all this is preliminary to telling you what, in my judgment, although that perhaps isn't shared entirely by the other directors of the Society, is the one thing, the one big thing, the one thing that is going to do more than any other one thing, or one act on the part of the industry to sell electricity throughout this country to every citizen, and that **is to have everybody throughout the country reading about electricity and electrical service, having it hit him between the eyes when he picks up his magazine, paper or what not.**

One of the things that this Society has been doing in past years has been to get into trade papers and the monthly national magazines and every conceivable form of literature the story to the average person as to what electricity means to him in his home, and in his factory, and in every application and walk of life.

Now that, as I said before, seems to me to be one thing alone, irrespective of everything else, that may be done by this united effort which will count in tremendous results, in very many times over the money spent, and furthermore, it is one thing that is absolutely impossible to do in any other way than through a national movement that fits in with, and in no sense contradicts, all of the possible effort that can be put into effect in each locality and in each place by the local company and by local activity.

Something About Merchandising

I am asked to say something about merchandising. I am not a merchant of electrical appliances, and therefore I am not speaking from my own experience or outlining any policy which I am carrying out with the purpose of selling electrical appliances direct. I am tremendously interested in the acomplishment of the merchandising of electrical appliances. I believe this affords a tremendous opportunity in the immediate future. I have in mind, as one of the old men in the electrical industry, that it is not so very long ago when the electric motor was a novelty. The central station companies were organized primarily to do a lighting business, the power business was very, very incidental, but the power business is now seventy-five per cent of the volume of business of the larger companies. So that this motor business has been developed within a much shorter space of time than the lighting business. There are now twelve million, nine hundred and thirty thousand h.p. of electric motors on the lines of the central station companies throughout the country.

The next step in the enormous development along electric lines, paralleling to a considerable extent, if not entirely, the experience of the electric motors, will be electric appliances. Already central station companies find that in residential districts during at least the period of the year for which statistics are available, they sell as much electrical energy for other than lighting purposes as they do for lighting purposes alone. Our general manager in Cincinnati figured out for me the day before yesterday that there were potential sales with electric consumers now on our lines in the form of electric appliances for domestic use only to the amount of at least ten million dollars. Maybe I shouldn't tell that to these boys of Cincinnati, but I suppose I can't get them out of the room. There is ten million dollars in electric appliances that can be sold in Cincinnati before we connect another electric consumer to our lines, and I think I am entitled to credit, perhaps, for saying that I am not going to get into the business of selling any of those appliances myself. And furthermore, I am absolutely certain in my own mind that there is no necessity and if no necessity, no justification, for those appliances being sold on any other than a sound merchandising basis yielding the seller a proper profit on his work.

Unlimited Possibilities

I believe with the right amount of effort it will be just as possible, perhaps just as easy, to sell those appliances, at reasonable rates—and so far as my influence goes with my own company or elesewhere, that is the policy I very heartily and cordially recommend. This merchandising business, therefore, of appliances, if that is a fair statement of the prospects, in a relatively small city, if that is the case in one city, multiplied by the number of cities in the country shows the unlimited possibilities.

Sometimes we have spent a lot of time discussing policies. Some of us are of the opinion that it is the policy that produces the results rather than the amount of work that is put behind the policy. I will tell you a secret, that in past years we have spent considerable time in our Electric Light Association Conventions discussing policy, and some companies have had one policy, some companies have had a policy totally different, and I noticed on more than one occasion that the representatives of two companies have given almost identical results as to percentage in increase of business over a corresponding period of time, and each one has said that he believed it was the policy that they adopted that led principally to the result. Then when he found out that another man in another city claimed the same thing for a policy diametrically opposed, he had to fall back upon the suggestion that perhaps a policy good for one city was not equally good for another city. It merely proved to me that it wasn't the policy at all that got the results, but it was the amount of work that was put back of it. I am rather growing to the philosophy in my own mind, resulting perhaps from age, that economists are disposed to place too much stress upon the value of certain policies and too little stress upon undertaking to get results, even though we are not entirely agreed to the policy that should be pursued.

I want to say to you men that I have only one sure rule for getting results, and that is WORK. I know that the right amount of intensive work will produce results. In our own territory in a city that has shown very little growth, where we have had to depend upon population that has been there for years, we have in five years multiplied our business and our number of electrical consumers practically by three. We have shown for five years past an average gain in the number of consumers and in the output of electrical energy of forty per cent per year, and we are showing in this month, as in each preceding month of this year, a record fully up to any part of that five years' record.

Use Intensive Methods

When there was an inclination in the early part of the year to a falling off in results, when there was an inclination to say "industrial conditions are not going to be so good, we cannot expect such good results," we tried the plan of putting on simply more men to intensify our effort and increase our results, and we have proven to our satisfaction that it works.

What I had in mind in mentioning that, and of course what applies generally can't be applied too literally to each individual case, I recognize that, as you do, but what I have in mind is this: We are all of us thinking more or less that times are not as good as they were, we are thinking of curtailing and curtailment in expenditures along some lines is absolutely necessary. I want to merely suggest to you that **when business is poorest, when business is not coming in, or the volume of business that comes in without very much effort is at the lowest point, that generally is the time for the most intensive effort on our own part to make the period of depression as short as it can possibly be.** We can to a considerable extent, I know we can in the central station industry, and therefore I have the temerity to suppose that perhaps you can in your line, shorten the period; we can control these periods of depression by a greater activity on our own part. We can very often spend more money, even when every dollar seems like a drop of blood that we are spilling, we can spend more money to better advantage than would result from saving money, if the money is spent along productive lines.

My message to you men, insofar as I have a message, coming from our own industry, is a very firm belief, based on my own experience, that there is every occasion for encouragement, there is every occasion for the spending of money, real money, along lines of constructive and intensive effort, and I believe the more money we spend wisely, the more effort we put forth wisely, even in times when business seems to be poor, the sooner we will ride over that period and get back into signs of real, enthusiastic prosperity. I am sure that you are meeting here with that enthusiastic point of view. I have seen nothing on the faces of anyone here to indicate otherwise, and I am sure that in voicing these sentiments I am not saying anything that is contrary to your own point of view, but it may be encouraging to you and re-enforce your own ideas to have that message come from another industry.

The Basic Fundamentals of Water Power

On Thursday the 19th January, Mr. C. H. Attwood, District Chief Engineer, Dominion Water Power Branch, gave a very interesting and instructive address, before the members of the Manitoba Electrical Association.

In the course of his address Mr. Attwood said:-

I think we all realize the extent and the richness of the agricultural lands of this Province, but very few people realize and appreciate Manitoba's bountiful inheritance of varied natural resources among which the water powers are of paramount importance.

The total power possibilities of Manitoba at known power sites or falls as at present estimated is 3,200,000 h.p. at ordinary minimum flow and 5,200,000 h.p. for maximum development. While many of these water powers are at present somewhat remote from the more thickly settled parts of the province they are for that reason more particularly important for the exploitation of the natural resources of the hinterland. Of the larger powers such as those on the Nelson River which amount to some two and a half million horse power we can confidently expect that with the great advances in the art of electrical development and transmission that most of these powers will in time prove to be important factors in the solution of fuel-power and industrial problems of the province.

Practically every great industrial centre in Canada is now served with hydro-electric energy and has within easy transmission distance ample reserves of water power. In those localities where water power is not available nature has bountifully supplied fuel reserves of coal, gas or oil.

According to a recent computation, the water power resources of the British Empire have been placed at from 50 to 70 million horse power. To this total Canada contributes some 20 million horse power. From statistics just compiled there is installed throughout the Dominion some 2,430,000 turbine or water wheel h.p. and the ultimate capacity of the present plants and those now under construction totals some 3,400,000 h.p.

Over 90% of the primary power used in central stations throughout the Dominion is derived from water power, and of the total water power installed about 75% is installed in central electric stations, i.e., stations which are engaged in the development of electrical energy for sale and distribution for lighting, mining, electro chemical and electro metallurgical industry, milling and general manufacturing. The pulp and paper industry utilizes some 475,000 h.p. of which 385,000 h.p is generated directly in the pulp and paper plants, and some 90,000 h.p. purchased from hydro-electric central stations. Other industries may be listed as follows: For lighting purposes, 435,000 h.p.; in the mining industry, 180,000 h.p.; in flour and grist mills, 43,000 h.p.; in timber and saw mills, 38,000 h.p.; in other manufacturing industries, 175,000 h. p. These figures are evidence of the widespread manner in which the Dominion's water power resources are being applied to the furtherance of its industrial development. In addition to the above some 230,000 h.p. is exported to U.S.

With a water power development of 274 h.p. per 1000 of population, Canada stands well in the forefront in respect to the utilization of hydro power resources. The enormous water power reserves still untouched form a substantial basis for the progressive exploitation and dvelopment of other natural resources and if properly co-ordinated with the development and utilization of the enormous fuel resources of the Dominion, are an assurance of continued industrial expansion and prosperity.

U. of T. Research Bulletin

A valuable bulletin has just been issued by the University of Toronto, Faculty of Applied Science and Engineering, School of Engineering Research. The bulletin contains five papers on Current Transformers, as follows:

Effects of Magnetic Leakage in Current Transformers.

An investigation of flux distribution in the cores of current transformers of different types and related effects. Some remarkable conditions are found in certain standard types.

Method of Measuring Ratio and Phase Angle.

A description of the method employed, and some discussion of errors in measurement from changing turns-compensation, due to change in wave form. Oscillagrams showing wave forms.

Through-Type Portable Current Transformers.

A quantitative investigation of the variations in ratio and phase-angle errors with changes in position and arrangement of primary conductor.

Determination of Turn-Ratio of Current Transformers.

A method too inconvenient for commercial use, but having some features of interest.

Minimizing the Errors of Current Transformers by Means of Shunts.

Effects on ratio and phase-angle errors of turns-compensation, and secondary and primary shunts of resistance or condensance or both.

The authors of these papers are H. W. Price, professor of Electrical Engineering, and C. Kent Duff, research assistant, either individually or in collaboration.

Mr. V. Judge, 51 Gladstone St., Montreal, has been awarded the contract for electrical work on five residences recently erected on Kensington Avenue, Montreal, at a cost of approximately $40,000, for Mr. G. E. Blackwell, 4184 St. Catherine St. W.

A Tribute to the Work of the Water Powers Branch at Ottawa

Public recognition in the form of a glowing tribute to the work of the Water Powers Branch of the Dominion Government, was voiced by Edward Anderson, K.C., at a largely attended meeting of the Manitoba Electrical Association held recently, over which M. E. Deering presided.

Mr. Anderson said that due to the ability and vigilance of Mr. Challies and Mr. Attwood, and their colleagues in the Water Powers Branch, the maximum power development of the Winnipeg River was now assured for all time, and added "If the people of Winnipeg knew how much they owed to the officers of the Water Powers Branch they would be grateful indeed, for their work has been of inestimable benefit."

Mr. Anderson's remarks followed an address by Mr. C. H. Attwood, District Chief Engineer of the Dominion Water Powers Branch, on the "basic fundamentals of water powers" in which he described the organization which existed for measuring water, collecting data and putting same in shape so that it might be used when it came to the point of designing for water power developments.

Mr. Anderson said:—"I am indeed happy to have an opportunity in a public way of expressing my great appreciation of the efforts of the Water Powers Branch of the Dominion Government, which is represented in Winnipeg in the person of Mr. Attwood.

"Perhaps I am in a better position than anyone else to offer a tribute of appreciation of the work of the Water Powers Branch because of certain connection I have had with that Department and with the Dominion Government in connection with the Lake of the Woods levels investigation before the International Joint Commission. It was my privilege to act as Counsel for the Dominion Government in that investigation and in that capacity I had first-hand opportunity of observing the work which had been done by the Water Powers Branch of the Dominion. I can tell you it was a real eye-opener to me, and if the people of Winnipeg realized just how much they owed to that Water Powers Branch they would be grateful indeed to that department.

"I have come into considerable contact with Mr. Challies, Chief of the Department, and never in my experience have I found public servants so zealous and energetic in the discharge of their duties as the gentlemen of the Water Powers Branch are—and always have been. They did not strike one at all as public servants in the ordinary sense of the word but rather people who have the interests of their particular department at heart, and who are ever on the alert to serve, not themselves, but the public.

"Let me illustrate in one or two instances how much the gentlemen of this department have done for the city of Winnipeg. The Lake of the Woods is a great reservoir where the water that flows down the Winnipeg River is collected. Were it not for the Lake of the Woods, the Winnipeg River would not exist as a potential source of power. It is extremely important, therefore, that all data in connection with the lake and the flow of the river, should be known and the Water Powers Branch has gathered all possible data and have intimately studied the situation. It is also exceedingly important that the water of the Lake of the Woods should be so regulated that there will be an even and continuous supply so that the maximum benefits of the Winnipeg River will be obtained. The question of these levels was referred to the Joint Commission and the work done in this connection by the Water Powers Branch of the Dominion was the most valuable work that was done and presented before that Commission, and Mr. Challies and his associates were always on the job and alert, and kept in the forefront the possibilities of the Winnipeg River and water powers to be developed there. Due to the ability and energies displayed by Mr. Challies and his assistants, and their ceaseless watchfulness, a good deal of good was accomplished, with the result that when the recommendations of the International Joint Commission come to be carried out as they undoubtedly will, you will have the maximum development that is possible from the water powers on the Winnipeg River.

"You probably all remember that not very long ago there was a good deal of discussion in the papers as to certain concessions obtained by Mr. Backus, and their effect on the flow of the Winnipeg River. The Dominion Water Powers Branch has only jurisdiction over rivers where the title has not passed to the Province. In the case of Manitoba the title is still vested in the Dominion—though in most Provinces the title is vested in the Provinces. The Winnipeg River runs through Ontario, as well as Manitoba. Mr. Backus has great developments at International Falls, at the head of the Lake of the Woods. Now there is a dam, called the Norman Dam, which is a strategic dam in connection with the outflow from the Lake of the Woods. The Water Powers Branch has exercised certain jurisdiction over that dam but has never possessed complete legal authority to control it absolutely. Mr. Backus got possession of the Norman Dam and acquired the Kenora Municipal Hydro-electric plant there and also got a concession known as White Dog Falls. It appeared to the Province of Manitoba, the City of Winnipeg, and the Winnipeg Electric Railway Company, that by virtue of the concessions he had obtained, Mr. Backus might be able to so control the outflow of the Lake of the Woods and the water in the Winnipeg River that it would act to the disadvantage of the users of the water power, developed in Manitoba on the Winnipeg River. And it was a serious, a proper and well-grounded fear that the people interested had in that connection. But Mr. Challies and his department, were right on the job, and it was largely through the instrumentality of that department—Mr. Challies, Mr. Attwood, and other colleagues—that matters were so arranged that the Dominion Government has now, beyond all question of doubt, the jurisdiction of regulating the outflow of the Lake of the Woods into the Winnipeg River, and we may be assured that for all time to come we will get the maximum development of the Winnipeg River.

"I am just giving these as illustrations which came to my attention whereby the services of this department, under Mr. Challies, have been of inestimable value to the citizens of Winnipeg and it is only proper the people of Winnipeg should know it. These gentlemen work in an unostentatious and quiet way. They do not advertise and the public does not know just how much, in their interests, they accomplish. But they are doing a great public service, and it gives me great pleasure to pay this small meed of tribute to them. No occasion has ever arisen in my experience in which I have been so glad of the opportunity of saying a few words in public in appreciation of the work of public servants.

Mr. G. A. Magowan, 94 Glendale Ave., has secured the contract for electrical work on a two storey building, being erected for the Goldstein Manufacturing Co. at 12-18 Beverley St., Toronto, at an estimated cost of $75,000.

Visiting Western Branches on Power Business

A recent visitor in Vancouver was Mr. W. O. Taylor, sales manager of the Northern Electric Company's power department. He arrived from Montreal on Jan. 23rd and left for the east on Jan. 31st going via C.P.R. and is visiting all of the company's western agencies en route

Contractors Meet in Montreal to hear Discussion on Merchandising Topics

The French & English sections of the Electrical Contractor-Dealers' Association of Montreal held a meeting at the Windsor Hotel, Montreal, on February 9th, at which Mr. C. D. Henderson, president of the Henderson Business Service, of Brantford, Ont., and Mr. Kenneth A. McIntyre, the Canadian representative of the Society for Electrical Development, New York, were the chief speakers. Those present also included some jobbers. Mr. Gaspe de Beaubien presided.

Mr. McIntyre's speech dealt principally with the electrical home shown in Toronto, with a view to giving some pointers in connection with the electrical home to be shown in Montreal. He referred to the advantages which would accrue to all sections of the industry from such an exhibition, remarking that it had an educational value to men in the industry as well as to the general public. He read a letter just received from Toronto outlining the results of the electrical home in that city. These included numerous sales of appliances, increased inquiries directed to controctor-dealers, inquiries for wired furniture, and also for information as how to lay out houses on the lines of the electrical home. He declared that the contractor-dealers were themselves partly to blame for the comparatively small amount spent on wiring, as in order to secure contracts, they had often suggested the elimination of a number of outlets.

Mr. Henderson described his business service and its operation. He also referred to the loose commercial methods of many electrical contractor-dealers. Of the four links in the electrical chain, that of the contractor-dealer was the weakest. Apparently the aim of many contractor-dealers was to get business, irrespective of profit. Some jobbers and manufacturers were also affected in a like manner. Volume was no doubt to be desired, but the paramount end in view was to secure a profit on the business done. Many contractor-dealers declared that if they added overhead to their charges they would lose jobs, which was a poor system of conducting business. Mr. Henderson said it would pay the large companies to undertake a campaign for educating contractor-dealers. During last year nearly three hundred thousand dollars were lost by the failure of contractor-dealers in Canada, a sum which could be cut at least in half if contractor-dealers would use good business sense, cease competition which was neither profitable to themselves nor to their neighbor, and would take the trouble to know the amount of profit they were making. He believed in making a legitimate profit, which in the end, was better for all concerned in the industry.

Mr. J. A. Anderson, president of the Association, spoke of the progress which the Association had made in securing the co-operation of the contractor-dealers and jobbers. Let them, he said, charge prices which were fair and reasonable and which would allow decent wages to the workmen. Many contractor-dealers were working at rates which did not allow them a fair profit, and it was one of the objects of the Association to educate such men on the necessity of adopting a higher standard in order that it would benefit not only themselves but the industry generally. Mr. Anderson added that the English section now numbered 35 members, nine new members being added within a week.

Mr. S. W. Smith believed that the efforts of the Association would gradually result in stronger co-operation between contractor-dealers and the jobbers. They must get together in order to put their business on a better basis.

In the course of further discussion it was stated that the contractor-dealers and jobbers had agreed on a code of ethics.

Annual Convention A.M.E.U.

[Concluded from page 35]

"It is proposed to have on May 4th, a Hydro day and I hereby wish to extend to the members of your association a hearty invitation to visit this exhibition on the above date. If you will be kind enough to send me the names of members of your association, I shall be very pleased to mail them complimentary admission tickets to the exhibition.

"I shall also be pleased to send you more information regarding same from time to time."

Mr. V. S. McIntyre, Hydro Manager at Kitchener, supplemented this letter by a very cordial invitation to the members of the electrical fraternity.

He pointed out that this scheme is not primarily for the purpose of advertising certain lines of electrical goods, but rather to demonstrate the adaptability of electricity to our everyday needs and that there will be about 52 exhibits of the uses of electrical current. He mentioned certain unique applications of electricity. For instance, the Rennie Seed Company are going to show a lawn grown by electricity without ground for soil. They are going to clip the lawn inside of 24 hours and mow it inside of five days. The grass seeds are put on a piece of wet flannel, and electric current passed through this flannel germinates the seeds. Another novelty will be a wireless concert played by an orchestra in Pittsburg.

Election of Officers for 1922

It is always at this meeting that the officers are elected for the year. The balloting resulted in the election of the following gentlemen:

President, M. J. McHenry; vice-president, A. T. Hicks; secretary, S. R. A. Clement; treasurer, G. J. Mickler; directors at large, P. B. Yates, O. H. Scott, H. H. Couzens.

District Directors—Niagara, J. J. Heeg; Central, W. E. Reesor; Georgian Bay, E. J. Stapleton; Eastern, H. F. Shearer; Northern, R. H. Staford.

The "Get-Together" Dinner

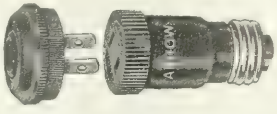
The usual "Get Together" Dinner was held on Thursday evening, and every delegate must have been present, for the dining room was crowded to its limit. The speaker of the evening, as announced beforehand, was Mr. F. A. Gaby, chief engineer of the Hydro-electric Power Commission of Ontario, but in Mr. Gaby's enforced absence Major Hume Cronyn, of London, called upon at the last moment, very kindly consented to take Mr. Gaby's place. His address dealt with Canada's necessity for an industrial research laboratory. Major Cronyn was Member of Parliament at the time this matter was brought up in Ottawa by the Advisory Council for Scientific and Industrial Research. Indeed, he was one of the strongest advocates in the House of the formation of an Industrial Research Department at some strategic point or points in Canada, where the problems of the Canadian manufacturer could be studied and solved. He outlined the fight put up by the Government for the establishment of this laboratory and the Bill's final defeat in the Senate. The address was a very masterly presentation of the needs and claims of Canadian industries for governmental assistance of a kind such a laboratory could offer and there was no question but that the sympathies of the audience were entirely with the movement. Indeed, this sentiment was expressed in every quarter, with the hope that the present Government would see its way to introduce and carry through a similar Bill in the near future.

The meeting adjourned early so that the members might have the evening to themselves to attend theatres. A number of the delegates took advantage of this lull in the proceedings to visit the Electric Home being shown in Toronto at that time by the Electric Home League.

What is Newest in Electrical Equipment

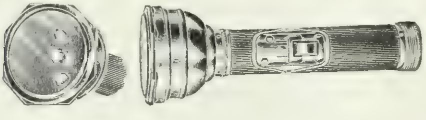
Convenience Arrow Plug

The Arrow Electric Company are making the "Convenience" plug illustrated below, by means of which it is more easily possible to attach the appliance to a lamp socket with a shade on it. The use of a lamp socket for electrical appliances is, of course, not the ideal method or a method that can be encouraged indefinitely, but, in the meantime, it is much better that householders should utilize devices of this sort than be without electrical appliances.



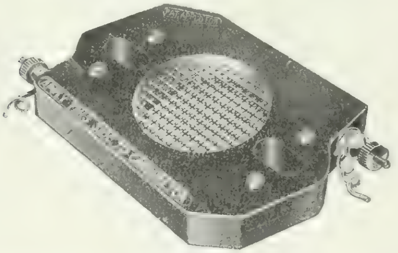
"3-in-1" Searchlight

A searchlight equipped with three lamps has been placed on the market by the Franco Electric Corporation, Pearl and Tillary Sts., Brooklyn, N. Y. Features of this device include a scientifically developed reflector throwing a sharp, concentrated beam of light; a newly developed lens ring with a nickel finish; and an improved contact box which permits each lamp or all three to flash intermittently or light continuously. The device is equipped with spring lamp sockets so as to hold reflector in place when lens and lens ring are removed. For signalling purposes red, green and clear lamps may be inserted. The shock absorber is independent of the reflector and lamp base and this will protect the lamps against any undue jars. Equipped with 3.8 volt Mazda lamps and "Franco Monocells."



Electric Vaporizer for Motor Cars

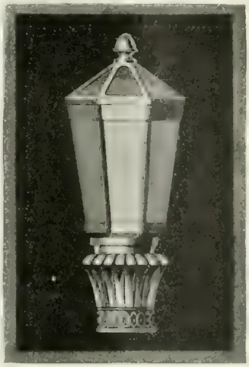
The device illustrated herewith, an Electric Vaporizer manufactured by the Kase Electric Co., Sherwood Building, Duluth, Minn., will interest motor car owners. It consists of a set of four metal grids in a heat insulating case, made in the form of a gasket, which is placed between the carburetor and the intake manifold flanges. One terminal of the heating grid is connected to the battery, through a snap switch placed in any convenient location, and the other terminal is grounded. The object of the heater is to dry and warm the gasoline vapor as it passes into the manifold so that ignition may take place promptly.



New Street Lighting Unit Gives Good Distribution

The Westinghouse company has recently developed a highly efficient post top of novel design for use with Mazda "C" lamps, in which upper and lower parabolic reflectors are used to direct the light on to the plane of illumination. The quality of the light emitted by the Reflecto-Lux units is brilliant and sparkling, and they have been designed to distribute a flood of light on the streets, with a small amount upwards to light the fronts of the adjacent buildings.

The maximum light is emitted at approximately 20 degrees below the horizontal and the distribution is ideal for mounting heights and spacings customary with ornamental street lighting. The distribution is obtained by upper and lower parabolic reflectors, which direct the light outwards and, in addition, a portion of the light in the upper hemisphere is re-directed by an opal glass band around the upper hemisphere of the lamp, or by a band of enamel on the lamp itself. The construction of the Reflecto-Lux units is rugged, the frame is of galvanized cast iron, and the glass panels are set in felt gaskets, making the whole thoroughly dustproof. In the post top, the lamp burns in a "tip up" position and is readily accessible for cleaning and replacement through the hinged top cover. In the pendant unit, the lamp burns "tip down" and access is obtained to the interior of the lantern through the bottom casting, which is hinged.



Babbitt Metal and Babbitting Motor Bearings

Babbitting motor bearings is described in detail in Circular Reprint No. 104, published by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The publication is a discussion of the production of babbitt metal by J. S. Dean, of the Railway Engineering Department, Westinghouse Electric Company, and it contains a number of photographs of equipment used in the manufacture of babbitt metals as well as the results of various tests of samples of alloys.

A general discussion of the cost of lead base babbitt metal is contained in Folder No. 4475, just published by the same company. The publication describes the properties and applications of Westinghouse lead base babbitt metal, known as Westinghouse Alloy No. 25, and genuine babbitt, known as Westinghouse Alloy No. 14.

The Crouse-Hinds Company of Canada, Ltd., are distributing a folder describing ZY Condulets for control of small motors. This folder is well illustrated, both in the detail of these condulets and in their actual installation.

New Sign Receptacle

The Canadian General Electric Company have a new sign receptacle in which the screw shell can be removed and replaced by a new one just as readily and easily as a burned out lamp can be replaced. Those who have had experience in keeping electric signs in service will realize the importance of this removable shell without the necessity of dismantling the fixture. In the ordinary way two men are required for the operation, but with the new receptacle one man can correct the trouble without difficulty. Another feature is the bushing and nut in the lugs of the receptacle. The manufacturers have spun a bushing and nut combined, which is made fast into the porcelain, so that the screw hole is easily found when fastening the receptacle to the back of the sign.

Ferranti's New General Manager

As mentioned in our last issue, Mr. A. B. Cooper has been appointed general manager of the Ferranti Meter & Transformer Manufacturing Company. Mr. Cooper's many friends will recognize in his photograph, reproduced herewith, a particularly pleasing likeness.

Mr. Cooper brings to his new position wide experience in the electrical field. He has been with the Canadian General Electric Company for the past eight years, as transformer sales engineer. Immediately previous to that period he was in the Transformer Sales Department of the General Electric Company at Schnectady and Pittsfield. At a still earlier date he was on the staff of the Rio de Janeiro Tramway, Light & Power Company as inspector at the Westinghouse plant in East Pittsburg, Pa., and was for a time stationed in Brazil as assistant engineer.

Mr A B Cooper

Mr. Cooper is a Canadian, of United Empire Loyalist stock, but by force of circumstances received his early training in the United States. He graduated from Tufts College in 1903 with the degree of B.A.Sc. He is also a graduate of the General Electric Test Course at Schnectady. He has always taken a keen interest in both engineering and social electrical activities. He is a member of the Engineering Institute of Canada, the American Institute of Electrical Engineers, and is a past chairman of the Toronto Section of the A.I.E.E. He is also a director of the Engineers' Club of Toronto. In addition, he is known as an enthusiastic golfer.

It is certain that Mr. Cooper's wide experience will be of very material assistance to his company. He is planning to spend a few months in England in the near future so as to thoroughly acquaint himself with the practice and policy of the parent company, Ferranti Limited, of Hollinwood.

Mr. Daly Goes to Regina

The Northern Electric Company has just announced that Mr. J. A. Daly, manager of the Hamilton office, has been transferred to Regina, where, beginning March 1, he will have charge of the Saskatchewan province territory. Mr. Daly has been associated with the Northern Electric Company since 1908, first in Montreal and later in Toronto. From 1910 he represented his company in Northern and Eastern Ontario, and likes to recall the old corduroy roads of the early days of the Golden City and Porcupine mining camps, the big bush fire of 1911, the booming days of Cobalt, and the National Transcontinental Railway construction, when $15,000 orders were common affairs in which "Jim" rather more than held his own. During these years Mr. Daly organized and assisted in the establishment of many rural, municipal, co-operative and private telephone systems, with the result that the north country to-day, even though miles from a railway, has as good a telephone service as Central Ontario. During the past three years he has been in charge of the Hamilton office, which is responsible for the Niagara Peninsula district. He has been active always in association work and one of the pillars of such organizations as the Hamilton Contractor-Dealers' Association, and the Hamilton District Electrical Development League.

Mr J. A Daly

Mr. Daly, during his comparatively short stay in Hamilton, has made many friends among the electrical fraternity who are exceedingly sorry to lose him. A very handsome reminder of this fact in the shape of a silver cigarette case, was presented to him by the Executive Committee of the Electrical Development League of Hamilton on Friday evening, February 3, on the occasion of this Committee's visit to Toronto to inspect the Electric Home. Mr. W. H. Childs, chairman of the Hamilton committee, made the presentation, and Mr. Daly, replying, expressed his appreciation of the gift and his regret at leaving so many good friends.

The A. C. Gilbert-Menzies Company had an attractive exhibit of their full line of equipment at the Made-in-Canada Toys exhibit, recently shown at the Queen's Hotel, Toronto.

Electric Railways

Rehabilitation of Toronto's Electric Railway System—IV

Keeping in touch with the work from day to day—Speeding up the Service

In articles 1 and 2 of this series, which appeared in our issues of January 1 and January 15, the methods adopted in preparing and placing the track base, laying the rails and surfacing the roadway were described in detail. One of the most interesting features in connection with this work was the method adopted to keep the management in daily touch with the progress. For this purpose a chart was used, of which the accompanying illustration is an attempted reproduction. The original chart, however, told the whole story at a glance, as it was drawn in colors, thus making each day's progress stand out more prominently.

Each particular piece of work, i.e., each street, was taken care of by a separate chart. The reproduction refers to Yonge Street between Front and Carlton, where the track was entirely replaced (with the exception of certain intersections) as indicated on the left by A, B, C, D, E, F, G, H and I. Daily tabulation on the chart indicated the progress on these various items—wearing surface removed; concrete broken; grading; base slab poured; rails laid; track aligned and surfaced; joints completed; base poured and wearing surface relaid.

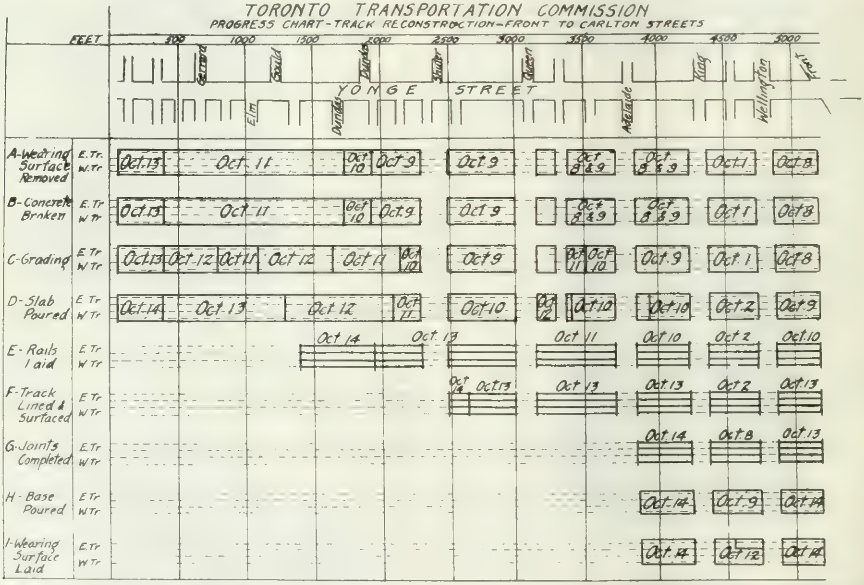
The dates written on the chart indicate the particular operation carried out on any particular day. In actual practice, [illegible] completed (square yards or lineal feet) in each day's work was written in the chart, but these have been omitted so as not to complicate the figures. The distances may readily be judged, however, as the chart is divided into vertical sections 500 ft. in width, as indicated on the top of the chart.

As will be seen from this reproduction, work was started on October 1. On that date 700 sq. yds. of wearing surface was removed, the concrete broken and the grading completed. On October 2 the slab was poured, the rails placed and the track aligned and surfaced. This was a special piece of construction work where it was necessary to have the cars operating again as soon as possible, and a special method of placing the rails and pouring the concrete, as described in our previous article, was used.

The chart then shows that no further work was done on this line until October 8, when the joints were completed on the section between King and Wellington Sts.; the wearing surface removed, concrete broken and the grading completed from Wellington to Front Sts.; also a certain amount of work on the first two operations, between Queen and King. On October 9, all the wearing surface had been removed as far as Alice St. The concrete was also broken to this point, grading was completed on a section between Albert and Queen and between Adelaide and King.

On October 10, the chart shows a small amount of wearing surface was removed between Alice and Dundas, and the concrete broken; two short pieces of grading; a considerable amount of concrete poured—at two different locations; and two sections of rail laid.

Thus progress of the work was indicated from day to day

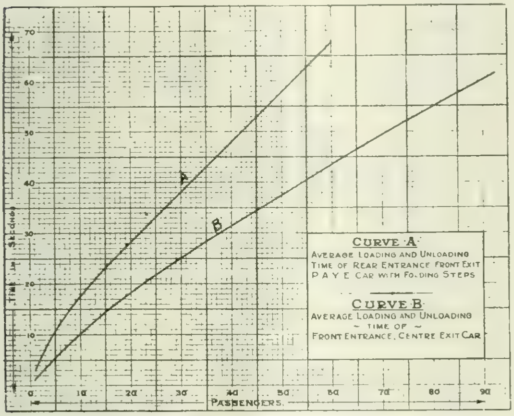


Typical chart showing day to day progress in the track rehabilitation operations of the Toronto Transportation Commission in accurate detail. The chart finally indicates the condition of the work on the evening of October 14.

Similar charts, covering the other streets where rehabilitation work was going forward, afforded, each day, a condensed but absolutely accurate view of the whole situation—a very important consideration, in view of the large scale upon which the work was carried out.

Some Comparative Loading Figures

Interesting figures have been prepared by J. F. Layng, electric traction engineer for the General Electric Company, covering the average loading and unloading time of the rear entrance, front exit P.A.Y.E. type of car, and the front entrance, centre exit type, the former used on Toronto streets up to September 1 last, and the latter since that date, in considerable numbers. These figures have also been plotted and are represented by the curves A and B in the accompanying illustration. The horizontal line measures passengers, and the vertical line time in seconds. Curve A represents the average loading and unloading time using the rear entrance, front exit P.A.Y.E. type of car. Curve B represents the average loading and unloading time of the front entrance, centre exit type, where practically half of the car is used as a loading platform. These curves indicate that a very appreciable saving in time is made with the newer cars and that the gain improves as the number of passengers increases. The feature in the new Toronto cars of an ample loading platform which is responsible in a considerable degree for this gain, is working out extremely satisfactory.



Curves showing the relative time consumed in loading and unloading two standard types of street car

A report of the London Hydro-electric System states that there are now more than 2,000 electric ranges used in that city. The activities of the past year are shown in the statement that 800 of these were added during 1921. The general manager, Mr. E. V. Buchanan, has just placed in operation a new distributing station, which is said to be one of the finest in the whole Hydro system, both in the matter of construction and design.

The Swedish General Electric Ltd., Toronto, have been awarded the contract for supplying the city of Winnipeg with two 310 kv.a. alternators, with accessories, for local service in the municipal power house at Point du Bois.

Hydro Development in the Maritime Provinces

By our Eastern Correspondent

The province of Nova Scotia some time ago created what is known as the Nova Scotia Power Commission, with power, among other things, to investigate and, if thought wise, to develop water powers at various points of the province. After careful investigation a hydro development has been carried out at St. Margarets Bay, situated some 15 miles out of Halifax, this power being primarily developed for use in that city. A power company called the Halifax Power Company, had done some preliminary work on this same development but finally the province took it over and completed it. The expectation was that the city of Halifax would buy the entire output but, after long negotiations, the city council decided against this course. The power was then offered to the Nova Scotia Tramways & Power Company, Ltd., with whom a contract has just been signed. In brief, the contract remains in force for 30 years and by it the Nova Scotia Tramways & Power Company purchases power up to 18,000,000 kw. hrs. per year, at actual cost, and distributes the energy to the citizens of Halifax. The cost price of the current to be paid by the company is determined by the Nova Scotia Power Commission, but the selling price at which the energy is to be retailed to the ultimate consumer is determined by the Provincial Board of Public Utilities. A clause in the contract provides that the Commission may sell direct to the city of Halifax as a municipality, for the municipality's use, but not for resale.

It will be noticed by the above that a Board of Public Utilities is mentioned. This Board controls the rates in the province of Nova Scotia for electricity and gas, as well as street railway fares. The situation in this province, therefore, is that a provincial body (the Nova Scotia Power Commission) is selling power to a private company (the Nova Scotia Tramways & Power Company) and the final rates paid by consumers is being adjusted by another provincial body (the Board of Public Utilities). This certainly seems to protect the public adequately but, in addition to this, there is a clause inserted in the contract providing for one representative of the city of Halifax on the Board of Directors of the Tramways & Power Company, this representative to be named by the Governor-General-in-Council.

It would appear that the Nova Scotia provincial government, and the Nova Scotia Power Commission, are to be complimented on the outcome of these negotiations. The consumer seems to be adequately protected and there has been no duplication of equipment or drastic action that might be construed as equivalent to confiscation.

Mention should be made of the activities of Mr. K. H. Smith, chief engineer of the Nova Scotia Power Commission, who has been actively interested in the negotiations and largely instrumental in bringing them to such a happy issue.

The Harvey Hubbell Company of Canada, Ltd., are distributing a folder describing the Hubbell Te-Tap Ten, with illustrations. This is an assortment of ten standard Hubbell electrical specialties such as might be sold to any one customer as easily as any one of them might be sold singly. This assortment, therefore, means, ten sales instead of one.

Mr. Arthur E. Wilson, for some 26 years with the Canadian General Electric Co., and recently sales manager of Earle Electric, Ltd., has been appointed sales manager of Factory Products, Ltd., 220 King St. W., Toronto. Mr. Wilson succeeds Mr. Langmuir, who is severing his connection with Factory Products, Ltd., to engage in another line of business.

Current News and Notes

Arnprior, Ont.

The Modern Electric Co., Arnprior, Ont., has succeeded Mr. D. O. Booth, who formerly carried on an electrical contractor dealer business in that place.

Calgary, Alta.

The Cunningham Electric Co., Leeson & Lineham Block, Calgary, Alta., has secured the electrical contract on the building of the Royal Bank of Canada, 3rd St. and 8th Ave. W., Calgary, which is undergoing alterations.

Fredericton, N.B.

A report states that the city of Fredericton, N.B., has been temporarily deprived of electric power because of a mishap in the plant of the Maritime Electric Company.

Hamilton, Ont.

Tenders for the electric wiring of a new school to be erected at Hamilton costing in the neighborhood of $425,000, will be called for by the architect, F. W. Warren, Hamilton, on March 1.

Kingsville, Ont.

Messrs. Harris & Russell, Kingville, Ont., have been awarded the electrical contract on a building being erected by Messrs. Birch & Scrigley, Kingsville, for a garage and sales rooms.

Kitchener, Ont.

The Doerr Electric Co., Kitchener, Ont., has secured the electrical contract on the Evangelical Church, Kitchener, recently erected at an approximate cost of $40,000.

The Electric Light Commission of Kitchener, Ont., is having plans prepared for a street lighting system costing in the neighborhood of $60,000. The city clerk will receive tenders between May 1 and May 15 for about 50 iron standards and 50 200 watt electric lights.

London, Ont.

The Lavender Electric Co., 7 MacDonald Ave., London, Ont., has secured the electrical contract on a store recently erected on Horton St., London, for Mr. R. H. Smith of that place.

Montreal, Que.

Messrs. Vallee & Hamelin, 1867 St. James St., Montreal, have secured the contract for electrical work on an addition recently built to a store at 414 St. Lawrence St., Montreal, at an approximate cost of $18,000.

Mr. J. J. Valois, 444 Durocher St., Montreal, has been awarded contracts as follows: Electrical work on a $28,000 apartment house on Champagneur St., Outremont, Que.; wiring and electric fixtures on an apartment house to be erected at St. Denis and Demontigny Sts., Montreal, at an estimated cost of $80,000; electric fixtures, wiring and ranges for a $28,000 residence recently erected at 54 Victoria Ave., Montreal; electric fixtures for a $32,000 apartment house recently erected on Girouard Ave., Outremont.

Messrs. E. Marcou & Frere, 450 Roy St. E., Montreal, have been awarded the contract for electrical work on two stores and four residences recently erected on Amherst St., Montreal, for Mr. Murphy, 29 Drummond St.

The Croteau & Labelle Electric Co., 233 St. James St., Montreal, has secured the contract for electrical work on a building at 241 Beaver Hall Hill that is being altered for offices at an estimated cost of $15,000.

The annual meeting of the Laurentide Power Company is set for February 21. Figures available for 1921 operations indicate that this company had a very prosperous year, and, for the second time in its history, gross earnings have passed the million dollar mark, being $1,237,561, as compared with $1,040,887 for the year 1920. Net earnings amounted to $570,740, as against $432,225 for the previous year. The president of the company, in his report, states that the earnings for the past year are based upon the sale of 112,500 average horsepower for the year.

Outremont, Que.

Messrs. Crane Ltd., St. Patrick St., Montreal, has secured the contract for electrical fixtures for an apartment house recently erected on North Bloomfield Ave., Outremont, at an approximate cost of $53,000, for Mr. E. Hogue, 365 De Lanaudiere St.

Quebec, Que.

The newly formed Quebec and District Amateur Radio Association decided, at a recent meeting, to meet every Wednesday evening. Club rooms are being arranged for. The secretary of the association is Mr. L. P. Soucy, 82 Aberdeen St., Quebec.

St. Thomas, Ont.

Radio enthusiasts of St. Thomas, Ont., are endeavoring to form a Radio Club in that city and have called a meeting to discuss the matter.

Saskatoon, Sask.

As a result of the introduction of one-man cars on the Saskatoon street railway system a deficit of $8,996, as compared with a deficit of $58,844 for 1920, is shown for the year 1921, a reduction of approximately $50,000.

Simcoe, Ont.

The Norfolk county Chamber of Commerce will urge that the steam road from Simcoe to Port Rowan be electrified and extended to Port Burwell.

Three Rivers, Que.

The North Shore Power Company, Three Rivers, Que., has secured the contract for wiring, poles, brackets and outside work on a $10,000 fire alarm system being installed by the Northern Electric Co., Montreal, at Cap de la Madeleine, Que.

Toronto, Ont.

Messrs. Beattie-McIntyre, Ltd., 72 Victoria St., Toronto, have been awarded the electrical contract on an addition recently built to the factory of George Weston, Ltd., 134 Peter St., Toronto.

Mr. B. C. Taylor, 25 Marchmont Road, Toronto, has secured the contract for electrical work on two stores recently erected on St. Clair Ave., near Lauder Ave., Toronto, for Mr. O. Extence, 103 Westmount Ave.

Mr. R. M. Mitchell, 140 Leslie St., Toronto, has been awarded the contract for electrical work on four stores recently erected at Greenwood and Danforth Avenues, Toronto, for Mr. John MacLean, 1204 Danforth Ave.

Messrs. Smart & Walsh, 57 Kildonan Drive, Toronto, have secured the contract for electrical work on a store and apartment building being erected on Danforth Avenue, near Glebemount Ave., Toronto.

Mr. A. C. Plumb, 33½ Burgess Ave., Toronto, has secured the contract for electrical work on a store building recently erected at Danforth and Glebemount Avenues, Toronto.

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Sir Adam Beck replies to Sutherland Commission Report

Sir Adam Beck has published an interesting reply to the majority report of the Sutherland Commission, appointed some time ago by the Drury Government to inquire into the subject of hydro-electric radials in the province of Ontario. Sir Adam reviews the situation from the inception of the hydro radial idea up to the present time, stating that the result of the controversy has been to unsettle the public's mind and leave it in doubt, first, as to whether the radials could be constructed and operated so as to be self-sustaining and, second, as to whether this could be attained without a duplication of railway lines that would be injurious to the country as a whole. He charges that the findings in the majority report show that the commissioners were "apparently unable to rightly weigh the great assemblage of material which they brought together, or rightly interpret its import."

Sir Adam makes some interesting remarks regarding the value that may be attached to the evidence of certain of the experts who gave evidence before the Commission, and points out, for example, that a number of these had had little or no experience except in steam railway work. He states that Bion J. Arnold, a witness who had expert knowledge of interurban electric railway operation, had reported favorably on hydro radials. Sir Adam deals specifically with the evidence of some of these witnesses. For example, the opinion of F. P. Gutelius, whose estimates of traffic possibilities are claimed to be ten times too small in view of actual figures available of interurban electric traffic in both Canada and the United States. For instance, Mr. Gutelius had said that nineteen trips per capita per year of population in Oshawa on a Toronto-Oshawa line would be "about ten times too much." Sir Adam answers this by quoting the figures between Toronto and Aurora, which represents 35 trips per capita per annum; Detroit & Northville, 30 trips, and a number of other similar instances. Sir Adam also points out that according to their own admission, the witnesses before the Sutherland Commission who strongly condemned the proposition, had made only a cursory study of conditions.

Sir Adam's reply, finally, deals specifically with the Sutherland Commission's three special objections—high construction costs; too low estimate of operating costs; too high an estimate of revenues.

High Construction Costs

He argues that the Sutherland Commission did not take into consideration the fact that the construction and equipment of the railways with which they compared the proposed hydro radials were not of a sufficiently high standard, and quotes the cost figures of a number of the better class interurbans in the United States to show that the Commission's estimates of costs were entirely unreasonable. He quotes examples of capital costs very much higher than the Commission's estimate, where a surplus is being shown year by year and increasing as the efficiency of these systems becomes greater. Sir Adam states that the Sutherland Commission failed to emphasize the fact that the most notable exceptions to the railways which are in trouble are the very railways whose construction and equipment are of the highest class. The average cost of the hydro radial system was placed at $140,000 per mile by the Sutherland Commission itself, and Sir Adam's reply quotes costs up to $225,000 per mile for lines in the United States operating successfully and doing better than paying charges.

Operating Costs

In the matter of operating costs, Sir Adam charges that the Sutherland Commission chose to deal in generalities. The operating ratio of the hydro radials had been placed at 55.7 per cent. The Sutherland report contended that this ratio was too small and published a table of fifteen radials in Canada and the United States where the operating percentages varied all the way up to 79.3 per cent. In his reply, Sir Adam charges that the figures quoted by the Commission apply only to the years 1919 and 1920, when operating costs were abnormally high. He also charges that the Commission failed to include in its list such figures as that of the Texas Electric Railway which, even in 1920, had an operating ratio of 50.9 per cent. Sir Adam submits a table of operating ratios for the years 1914, 1915, 1916 and 1917, for the most part, of six interurban railways in the United States where the percentages were as low as 46.49 per cent and the highest was 57.2 per cent.

Revenue

In the matter of revenue Sir Adam is even more critical of the Sutherland repirt, and states "Probably no other feature of the majority report discloses the inconsistent, inaccurate and inadequate character of the reasons given by the Sutherland Commission in support of its conclusions than the manner in which this subject of passenger revenues is dealt with." He states that the Sutherland Commission compared passenger revenue per capita upon a wrong basis; that they made poor comparisons; that they employed population data improperly—in one case including the population of the city of Toledo twice, thus reducing the per capita revenue unduly.

Sir Adam's argument closes with the following:

Conclusion

In dealing with public problems such as the Hydro-elecric Power Commission has dealt with, [illegible] Commission has regarded that adequate knowledge of any problem in hand, coupled with the zeal and enterprise for its successful solution, have really been more important factors than the mere acquirement of Capital. Once the essential factors are determined to be sound and favorable, they will irresistibly carry Capital with them. The Hydro-electric Power Commission investigated this subject of Hydro-Radials with a staff of expert investigators—and these cannot justly be discredited by the slighting personal remarks contained in the Majority Report of the Sutherland Commission. The Hydro-electric Power Commission's investigators have proved themselves competent to appraise essential data.

The Hydro-electric Power Commission asserted its own confidence in Hydro-Radials before inviting the confidence of others. The Commission's confidence was in the particular project it has recommended. It called for high-speed transportation between certain terminals traversing certain territory. The railway itself was to be of the highest standard in order to meet the demands which were to be placed upon it. The whole proposition was unique and of exceptional business promise. It is of no real pertinence to compare such a hydro-radial project with other railways which should not have been built. A rapid-transit electric road through a populous and prosperous territory and adjacent to thriving industries, is in a different category from a steam railway trying to tap the Arctic zone.

The very fact that hydro-electrical energy for driving the railway would be available at low cost, is of itself a factor of great significance and one which, had it been possessed by many electric roads in the United States, would have permitted them to operate in a manner they were unable to do with expensive steam-generated electric power. There is a wide difference between a cheaply constructed electric railway system, over-capitalized, using expensive power and operating on an ordinary street railway basis; and a strictly modern, high-class, rapid-transit electric railway, operating with cheap power. The latter is the Hydro-Radial proposition submitted for the acceptance of the public of Ontario.

Now, instead of appraising this proposition upon its merits, the Sutherland Commission has treated it in certain important respects as though it were one of the cheaply constructed electric railway systems, over-capitalized, operating more or less on the highways and streets, and depending upon expensive power. This statement is warranted because even though clearly recognizing that the Hydro-Radial project was unique, the Sutherland Commission, nevertheless, employed data relating to cost, operation, revenue and other features, of inferior electric railways as the criterion by which to judge the merits of the Hydro-Electric Power Commission's proposed radials. The STATEMENT here presented will, it is believed, sufficiently demonstrate the unjust character of the conclusions submitted by the Sutherland Commission in its Majority Report. Moreover, it should be fully recognized, not only that the data of revenues and other factors germane to the subject of Hydro-Radials have been incorrectly and unjustly applied, but also that if these data had been rightly applied by the Sutherland Commission there would have resulted a clear and outstanding demonstration of the soundness of the estimates of the Hydro-Electric Power Commission's experts; in other words, the Hydro-Radial project could not, even with the semblance of justification, have been discredited, but on the contrary would have had to be confirmed by sheer weight of evidence on record before the Sutherland Commission.

It is believed that the Hydro-Radial project may be advanced with caution and yet with great benefit to the Province as a whole. Later, after the success of the first Hydro-Radial installation of, say, 325 miles is assured, these lines may be extended and other new lines may be constructed as circumstances warrant. The whole radial scheme will thus gradually acquire a province-wide character, just as has been the case with the transmission and distribution of Hydro-Electric power, which has developed from its limited initial installation to its present province-wide proportions. It remains, therefore, for the people of the Province of Ontario to decide whether they will be guided by the conclusions of the Majority Report of the Sutherland Commission or by the representations made by the Hydro-Electric Power Commission based as they are upon the extensive and detailed research of experts in whose judgment the Commission has full confidence—a confidence, in fact, which has been increased rather than diminished by the criticisms which have been directed against them.

It is confidently believed that the Hydro-Radial Project which is recommended by the Hydro-electric Power Commission of Ontario will assuredly be of very great social, commercial and financial benefit not only to the municipalities directly concerned, but also to the Province and, indeed, to the Dominion as a whole. It remains, therefore, for the Public, in whose general interest the Hydro-Radial Railway Project has been conceived, to decide whether or not this Hydro-Radial policy of the Municipalities shall be consummated.

Symposium on Hydraulics

The interesting announcement has just been made that a Symposium on water power development will be held at Toronto University, in Room 22, of the Mining Building, from February 27 to March 6. This Symposium has been arranged by the Hydraulic Section of the Department of Mechanical Engineering of the University of Toronto, of which R. W. Angus is the professor.

Lectures will be delivered on various subjects by engineer graduates of the University of Toronto, and others. The following programme has been arranged: February 27, 4.30 p.m., "Some of the principles controlling the use and design of hydraulic turbines," by Lewis F. Moody, who also speaks at 8.00 p.m., the same date, on "Hydraulic turbines and installations"; February 28, 4.30 p.m., "Hydraulic equipment as affecting power house design", by Max V. Sauer; March 2 4.30 p.m., "Design of power canals, headworks and surge tanks," by Thomas H. Hogg; March 3, 4.30 p.m., "Power house machinery," by W. M. White; March 6, 4.30 p.m., "Regulations and testing of hydro-electric machinery," by Norman R. Gibson; March 6, 8.00 p.m., "Some economic aspects of hydro-electric power development," also by Mr. Gibson.

Speaking of the purposes of the Symposium, the announcement states that from the standpoint of the student, the purpose is more especially to bring him into direct contact with the engineers responsible for the great hydraulic developments in America. It is intended to supplement the courses in water power engineering and hydraulics now given, and to give students a somewhat broader vision.

To the practicing engineer it is believed the lectures will also be of value on account of the eminence of the lecturers, and it is also hoped that it may bring these engineers into a more vital relationship with the University. The hours set for the lectures are specially arranged for the benefit of engineers.

The Auto and Electric Service Co. have opened a workshop and garage at 591½ Richmond Street, London, for motor and generator repairs, also re-winding. They will maintain a Gould battery service station and specialize on automobile electric service.

City Superintendent of Vernon, B. C., Issues Challenge to Contemporaries

Mr. S. H. Excell, city superintendent of Vernon, B. C., has sent us further interesting figures in connection with the cost of operation and generation of power. For a plant of this size, the figures of Mr Excell are unusually satisfactory, but perhaps some western superintendent can go him one better:

City of Vernon B. C. Power Plant

Report on operations for the period, (Dec. 1920-Dec. 1921.)

Capacity of plant 532 kw. (Size of Units 157 & 375 kw.)
Output .... 1,068,284 kw. hrs.
Distribution of load.—Light & Utilities 61%. Power 13%. Heating 22.6%.

No. of services, all metered	1160
Load factor	22.9%
Maximum peak	360 kw.
Average peak	320 kw.
Kw. hrs. output per capita of population	267
Total expenditure on service	$54,847.59
Gross revenue	$64,152.73
Surplus over expenditure	$9,305.14
Fuel used	87,917 gal.
Cost of fuel	$13,515.00
Average cost of fuel per gallon	14.64 cents
Average cost of fuel per kw. hr.	1.24 cents
Average overall cost per kw. hr.	5.13 cents
Average return per kw. hr.	6.05 cents
Cost of generation per kw. hr.	3.596 cents
Operating cost of dist. system per kw. hr.	64 cents
Capital value of plant, (1921)	$145,741.72

Power plant, $80,741.72. Dist. system, $65,000.00

Note:— Average cost of fuel was higher than in 1920, owing to unusual high cost for the months of December to April, inclusive.

Analysis of Cost of Generation.—Year 1921

Item	Cost	Average Cost per kw. hr.
Fuel	$13,315.00	1.24 cents
Wages	$ 7,800.00	.730 cents
Interest, sinking fund & insurance	$12,250.00	1.146 cents
Mg'nt & office	$ 1,900.00	.181 cents
Lub. oil & supplies	$ 1,400.00	.131 cents
Repairs; govt. insp. chgs.	$ 1,550.00	.168 cents
Total	$38,415.00	3.596 cents

"The Installation of Power Plant Equipment" Before Toronto A. I. E. E.

On Feb. 10 the Toronto Section of the A. I. E. E. were favored by Mr. F. H. Farmer, of the Canadian Westinghouse Compny, who presented a paper dealing with "The Installation of Power Plant Equipment". He opened his talk by stating that while standard equipment such as motors and small transformers might be installed by the purchaser, it was wise in the case of large generating and transforming apparatus, particularly when this was of such magnitude that complete shop tests could not be made upon it, to have the installation made by the manufacturer. He pointed out the necessity of the closest co-operation between the manufacturer and the purchaser in such cases.

Attention was called to the rapid growth of the dimensions of equipment. But a few years ago, 5,000 kilowatts was considered an immense machine, and the sizes had quickly jumped to that of the present Queenston generators which were 45,000 kv.a., and were likely soon to be surpassed by 66,000 kv.a. machines in the plant of the Niagara Falls Power Company.

Mr. Farmer then gave considerable details of the dimensions of the Queenston generators, comparing the magnitudes of the various parts from small items such as the spiders weighing a mere trifle of 28 tons to the completed rotors or stators weighing over ten times that amount. It was evident that as sizes increased a greater percentage of the work usually done in the factory would have to be carried out at the plant, under conditions not as favorable as in the shop, and special methods would have to be developed to meet each individual case.

The speaker then gave a general outline of the methods followed in the setting up of large machines, starting from the turbine which, being less flexible in its placing, determines the final location of the generator. He showed how alignment was carried out, and pointed out the sources of error which might be looked for, and the care that must be exercised to avoid these. The placing of rotor shafts, the assembling of rotors, and the winding and drying out of the armatures was explained in detail.

The talk was concluded by some observations on the handling and installation of large transformers and switching equipment, after which a most interesting set of slides was shown, illustrating experiences which had been met with by the speaker in installation work in various parts of the Dominion.

Converting Winnipeg's Telephone Service to Automatic

The Manitoba Telephone System have contracted for additional automatic telephone equipment necessary to convert two of the Winnipeg exchanges to automatic service. The Winnipeg Office of the Northern Electric Company, were awarded the contract for the Fort Rouge exchange, the contract price being $423,254.00, and will supply their well known Strowger equipment. This type is now in use in the business or down town section of the City. This equipment will be a Canadian product, being manufactured in the company's Montreal factory. It is expected the first load of equipment will leave the factory during July, and the work will be completed and automatic service inaugurated in Fort Rouge area January 15th, 1923.

The Siemens Electrical Works of Woolwich, England, obtained the contract for St. John's exchange equipment, which differs in type somewhat from the Strowger or Northern Electric. The English firm is expected to complete its work in April 1923. The price of the Siemens contract amounted to $483,438.00.

The Manitoba Telephone System will undertake to convert telephones and outside plant to automatic conditions with their present staff.

Some 12,000 lines are involved in the two exchanges, and the work to convert telephones, adding dials, etc., will begin about April 1st., so as to be completed before freeze up next winter.

The Winnipeg public are well satisfied with the service rendered by the automatic system, in downtown offices, and the telephone officials anticipate like satisfaction will follow a similar service in the residential areas. It is understood that the automatic telephones make possible a substantial reduction in the annual charges by the elimination of the operator.

When these contracts are completed, two thirds of the city of Winnipeg will have the automatic system.

The Commercial Electric Company, London, Ontario, have been awarded the contract for the supply of new Raylite, 300 watt units for the new rotunda of the Belvedere Hotel, London, Ont.

Water Powers of the World

Figures Prepared by the Dominion Water Powers Branch, Department of the Interior

Many estimates of the world's water power have been published from time to time* but of late the available information has increased rapidly. The great increase in the cost of coal and the need of more power for manufacturing due to the war turned the attention of all civilized countries to the subject. Most of them increased or instituted active investigation of their power resources and the majority have since passed legislation nationalizing all power resources or provided for state bonuses or other forms of financial assistance to power development. As many of these investigations started four or five years ago, considerable information is now coming to hand and it is of interest to consider the latest estimates of the total water power of the world.

In addition to the new information available from Europe and the British Dominions, much matter of great interest concerning countries of which but little was known as to their water power resources, such as Africa, South America, and parts of Asia and Oceanica is now available in a recent publication of the United States Geological Survey.† This is an elaborate production containing 10 maps covering all parts of the world and the prologue states that every available source of information open to the U. S. Government has been made use of in compiling the particulars. Extremely valuable and interesting as this publication is, the time necessarily required to compile, print, engrave and issue so complete a paper prevents some of the figures from being the latest available, as in the case of Canada and a few other countries.

The following are a few points of especial interest from the above mentioned United States Report.

North America contains less than 15 per cent of the world's available water power but has developed more than all the rest of the world. The United States has 41 per cent of the developed water power of the world, Canada over 10 per cent (See below for comparison of development in the U. S. and Canada).

The largest water power development in the world is still that at Niagara Falls, where the total capacity in operation is 870,000 h.p. and this is being increased by 114,500 h.p. in the U. S., and 300,000 h.p. in Canada, which will bring the total up to 1,284,000 h.p.

The U. S. estimates are based on 75 per cent of the theoretical power from flow available at least 75 per cent of the time and may be summarized thus:—

	Horse-Power			
	Developed	Per Cent	Potential	Per Cent
North America	12,210,000	53.5	62,000,000	14.1
South America	424,000	1.9	54,000,000	12.3
Europe	8,877,000	38.8	45,000,000	10.2
Asia	1,160,000	5.1	71,000,000	16.2
Africa	11,000	.1	190,000,000	43.3
Oceanica (Including Australia & New Zealand)	147,000	.6	17,000,000	3.9
	22,829,000	100.0	439,000,000	100.0

It will be noted that Africa is credited with over 43% of the total potential water power of the world. According to the above quoted report this power lies mainly in the tropical portion, the north and south portions having small rainfall. In this area the Kongo river and its tributaries have a drainage basin of 1,500,000 square miles, nearly all of which is well watered. The Kongo affords greater water-power resources than any other river system in the world and more than one-fourth of the potential water power of the world is in this one river basin—more than 100,000,000 h.p. in two stretches alone.

A point of special interest to our readers is, naturally, how Canada stands in relation to other countries in water power development. It will have been noted above that the statment is made that the United States has 41% of the developed water-power of the world and Canada 10%. It has to be remembered, however, that the United States has a population of 100,000,000 and Canada of about 9,000,000 and to truly exhibit the comparative position the figures require to be put on a per capita basis. The comparison then stands thus:-

	Horse-power installed per 1000 of population.		
	1902	1912	1920
Canada	47	198	280
United States	26	51	93

It will be seen that the horsepower installed per head of population is three times as great in Canada as in the United States.

Particulars of the water power resources are now available for over 100 separate nations or countries and therefore form too entensive a list for the space available, but the figures may be given for a few of the countries in which the greatest development has taken place.

	Population	Water Power			
		Developed.		Available.	
		H. P.	Per 1000 population.	H. P. (minimum).	Per cent dev.
Sweden	5,814,000	1,460,000	251	4,500,000	32.4
Norway	2,700,000	1,350,000	500	5,500,000	24.5
Italy	40,000,000	1,150,000	287	3,800,000	30.2
Switzerland	4,000,000	1,070,000	267	1,400,000	71.4
France	41,500,000	1,400,000	34	4,700,000	29.8
United States	105,683,108	9,823,540	93	28,000,000	35.0
Canada	8,769,489	2,755,980	314	18,255,316	15.2

It will be seen from the above table that only one country, Norway, exceeds Canada in water power development per capita. In ratio of developed to available power it will be remembered that Canada is incomparably the less densely populated country and in this respect is over 100 years behind the next newest on the list, the United States.

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*See issues of Electrical News Dec. 15/21, Jan. 1/22.

†World Atlas of Commercial Geology Part II Water Power of the World. U.S. Geological Survey. Washington, D.C.

Would It Not be Advisable to Use Larger Size Meters?

In the letter reproduced below, a reader draws attention to an apparent error of judgment by someone in our industry—the result of the use of too small a meter on the average household load. He points out that the loss in revenue, due to meter inaccuracy on over-load, is much greater than the loss due to inaccuracy at part-load, and raises the question whether it would not be advisible, therefore, to install larger meters. The point, we believe, is well taken and we should be very glad to have the opinion of any readers on the point raised in this letter:

Editor Electrical News:—

There has come to be, in recent months, a quite general demand that house service meters should have an overload capacity of 100%. There are, of course, three functions of overload capacity:

1—The capability of withstanding short circuits without mechanical or electrical damage.

2—The current carrying capacity without undue heating.

3—The accuracy of the meter's measurement on overload.

It is with No. 3 that I propose to deal in this letter. There is no great difficulty in fulfilling the demand for a meter which shall register within 3% of accuracy on double load, but in the light of full knowledge of the induction meter's capabilities, it seems impossible to avoid a falling accuracy curve from full load to double load.

In explanation of the supply companies' requirements of 3% accuracy (which always means 3% slow) at double load. I am told that:

(a) The 10 amp. meter is enough for ordinary lighting purposes, but consumers instal additional apparatus without advising the supply authority, so that their consumption is liable to get as high as 20 amp. or more.

(b) The percentage of consumers who do this is nearly 100, and moreover the use of such additional apparatus is very great as it includes generally a cooking outfit.

(c) The meters usually installed are within 3 to 4% at double load (always slow).

I am unable to understand why a 20 amp. meter is not used as the standard instead of the 10 amp. meter when it is known that 20 amps. will be the usual load on the meter.

According to information (b), the use of apparatus such as stoves, irons, radiators and the like, is equal at the least to two hours per day, thus:—

$$\frac{20 \text{ amps. x } 110 \text{ volts x } 2 \text{ hours}}{1000} = 4.4 \text{ kw.h}$$

The meter which measures this is, as shown, generally about 3% slow at 20 amps.

The use of a single lamp is not common, but 1/20th load of the 10 amp. 110 volt meter = 55 watts, and this may be taken as the lowest likely lamp load.

55 watts for say 12 hours = 0.66 kw.h.

It will be seen that the extremes of a meter's accuracy curve are very different in their degrees of importance. As that part of the curve represented by 1/10th load to full load is within say 1% of accuracy in nearly all meters, we can ignore it for comparative purposes.

Therefore, in one day's consumption of power, we get:

0.55 kw. for 12 hours=0.66 kw.h.
2.20 kw. for two hours=4.40 kw.h.
Total consumption 5.06 kw.h.
3% error at 200% load, i.e., 3% of 4.40 kw.h. = 0.132 kw.h.; that is, nearly 3 % of the total bill.
3% error on 1/10 of full load, i.e., 3% of 0.66 kw.h. = 0.0198 kw.h.; that is, 0.39% of the total bill.

It is thus clearly established that a 3% error at double load is 9 times more important than the same error at 1/10th load. If the 55 watt load were not registered at all, the omission would probably be unnoticed on the total bill of the average consumer.

Will any engineer say why the main source of revenue, i.e., the 20 amp. load, should be registered by a 10 amp., meter which is known to be 3% slow on 20 amperes.

Why not use a meter big enough for its job and increase the revenue by approximately 3 per cent?

Yours truly
"Retem."

Geo. R. Wright, Winnipeg, district manager of the Canadian General Electric Co. Ltd., was married on the 18th of February to Miss Vera Whitmore. The staff presented him with a very fine case of Community silver. Mr. and Mrs. Wright are spending their honeymoon at the Pacific Coast. They expect to return to Winnipeg about the middle of March.

Pointers on Electric Power Rates for Industrial Engineers

By GEORGE MACLEAN*

Three subjects that are frequently little understood among men who are responsible for the purchase of power for industrial plants are the flat rates, kilowatt-hours and maximum demand. A flat rate is based on the connected load. Assume an installation of several motors, amounting in all to 200 h.p., and a rate of $40. per horsepower year is charged. Then the cost of power per month is 40 x 200÷12=$666.66 for the total connected load of 200 h.p. The advantage or disadvantage of a rate of this kind depends on the load-factor, or the ratio of the horsepower employed to the motor horsepower. From this it can be readily seen that if only 100 h.p. of the total connected load of 200 h.p. is being utilized, then the connected load-factor is 50 per cent., or 50 per cent of the connected load is being paid for and produces no return. Thus if the contract is on a flat-rate basis, watch the motors and keep them loaded up to full load, if possible. Also, the processes should be arranged so as to keep all motors in service as much as possible, for when they are stopped the power expense is still going on.

The kilowatt-hour is the equivalent of 1,000 watts for one hour, or 1,000 watt-hours. This method of buying power has the advantage over the flat-rate system, in that only the power used is paid for. If on 200 h.p. connected load only 100 kilowatt, or 134 h.p., is used continuously for one hour, the power consumed is 100 kw.h. and this is what is paid for. The total 200 h.p. is not paid for, as on the flat rate, but only for the actual power consumed by the motors.

Maximum demand presents a problem different from either the flat-rate or kw.h. rate. A special meter is connected in the circuit, which automatically registers the highest amount of power used over a certain interval of time. If you have contracted for 200 h.p., and the maximum demand does not exceed this, then only 200 h.p. is paid for. However, if the maximum demand is 250 h.p., say for 15 minutes, for any one day during the month, then 250 h.p. is charged for. The reason for this is that the power company is supposed to have to hold in reserve sufficient capacity to meet the needs of the customer. If it is evident that much can be done to keep the peak loads down by the proper manipulation and arrangement of machinery. For example, if there are a number of heavy processes that operate only intermittently, then, if it is possible to have different processes going on at different times, the load will be much lower than if all were in operation at once.

The maximum demand rate can also be used in conjunction with a kilowatt-hour rate; that is, so much per kilowatt-hour is charged and in addition to this, so much per kilowatt maximum demand for a given interval during the month is also charged.

The McDonald & Willson Lighting Company, 309 Fort St., Winnipeg, has secured the electrical contract on an office building being erected at 300 Main St., Winnipeg, at an estimated cost of $55,000, for the Northern Life Assurance Co.

The Manitoba Gazette announces that the Gamble & Willis Electric Co., Ltd., has been formed with headquarters at Winnipeg. The new concern will carry on the business of electrical contractor dealers. Capitalized at $4,500.

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*Electrical Engineer, Canadian Connecticut Cotton Mills, Sherbrooke.

First 50,000 h.p. Unit of Chippawa-Queenston Power Scheme—II.

Our First Article Described the Work in Connection with Location of Intake, Canal and Power House; also the General Design. Details of Hydraulic Installation Herewith.

Details of Hydraulic Installation*

Before dealing with the constructional details of the canal and power house, we shall treat briefly a few of the outstanding features in the hydraulic installation. The features to be touched upon cover the canal control gate, mentioned already as being situated within a few hundred feet of the point where the canal proper joins with the Chippawa River; the intake; ice chutes; screens; removable gates; penstocks; Johnson valves; turbines; governors, etc.

The Intake

The Commission has found it necessary to delay work on the intake to enable them to concentrate on other portions of the construction work. This was possible on account of the limited demand that will be made upon the water supply from Niagara River during the present winter. When completed, this intake will be of special design to take care of ice trouble. The design has been determined by a long series of tests and experiments with models. It is probably sufficient to say that at the moment the engineers believe the design they have adopted, will permanently remove the ice troubles which have caused a number of the power houses at Niagara Falls so much trouble in the past. In the meantime, water to operate the plant enters the Welland River through a natural channel which will eventually be closed when the permanent intake works have been installed

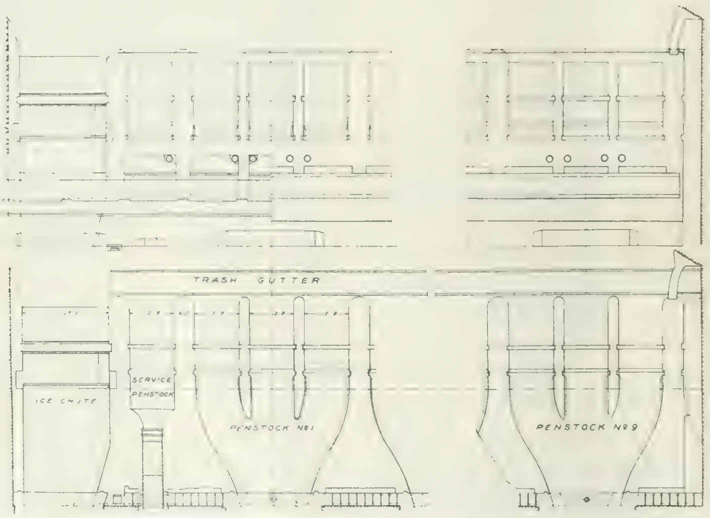
Canal Control Gate

A single motor-operated vertical lift roller gate for the purpose of controlling or entirely shutting off the flow is installed at the upper end of the canal near Montrose where the earth section of the canal merges into the rock section. The combination of span and head make this gate the largest ever built and particular attention was paid to the roller design in order to secure bearing loads well within safe, structural and operating limits. The clear width is 48 feet and the height of the gate is 42½ feet

The general arrangement of the control gate is shown. It will be noted that the lift is extended to a point 14 feet above the water level and thls has been done in order to permit a patrol tug to pass freely up and down the canal when the gate is in normal position, i. e., wide open.

The gate is counterweighted and operated by a motor connected through a worm drive to the two main hoisting gears, and the motor is provided with distant as well as local control so that the gate can be operated from the power house if required.

The gate itself is made up with horizontal trusses span-



Sections through intake to penstocks—Note triple openings and double gate protection

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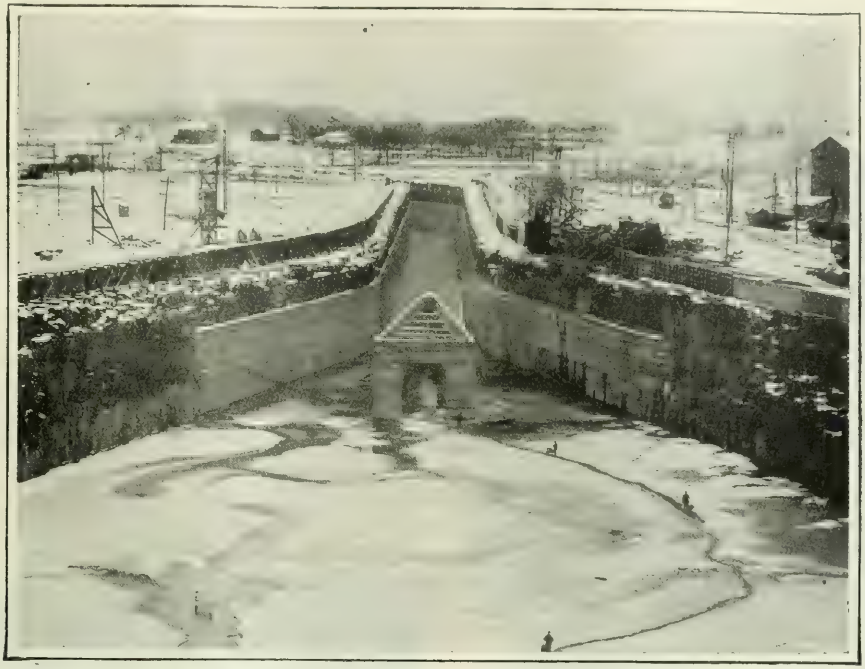
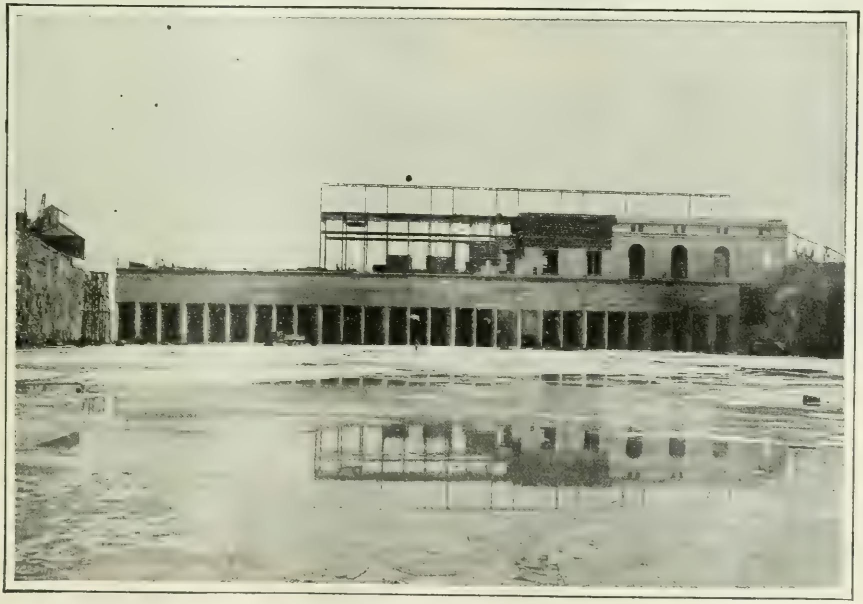
*M. V. Sauer, Assistant Hydraulic Engineer Hydro Electric Power Commission of Ontario

Two Views of Forebay from Opposite Points



Close-up view of diffuser where canal widens into the forebay



Screen house at end of forebay showing entrance to pipe-lines. The racks for screening the water and the gates for closing off the entrance of the pipe-lines are supported between the piers. There are three openings to each pipe-line.

[illegible] and vertical beams to [illegible] plate will be rivetted. It is not important that the gate be absolutely watertight when closed although "stanching" bars are provided to insert between the skin plate and the end guides which make it practically tight.

A comparative analysis of costs and operating conditions was made on the single gate as against two gates with an intermediate pier, and it was found that the cost of a single gate and superstructure did not exceed the cost of the twin gates, on account of the additional construction required by the intermediate pier and the necessary widening of the canal to keep down the velocity to normal. When the added advantage of having a clear unobstructed waterway was taken into account as well as the simplified operation of a single gate in place of two, the decision was entirely favorable to the single large gate.

View of penstock mouth from one of the three openings

Forebay Ice Chutes

It is expected that the intake as designed will take in water from the Niagara River, absolutely free from floating ice, but to take care of any ice that may form on the surface of the Canal or the Chippawa River channel, a small ice chute is provided at the lower end of the forebay. It consists simply of an opening through the screen house and down the cliff and under the power house to the lower river in a reinforced concrete pipe 10 feet in diameter.

Screens

The only feature of the screens worthy of comment is the wide bar spacing of 4½ inches in the clear and the layout of the bars and frames which are so designed that the whole frame with the bars attached is removable, thus leaving a completely unobstructed passage when they are removed. There are three bays of screens for each penstock and two frames in each bay. The tops of the screens are eight feet below the normal surface of the water and the maximum velocity of water through the screens is 2.25 feet per second. With these provisions it is not anticipated that anchor ice will cause much trouble.

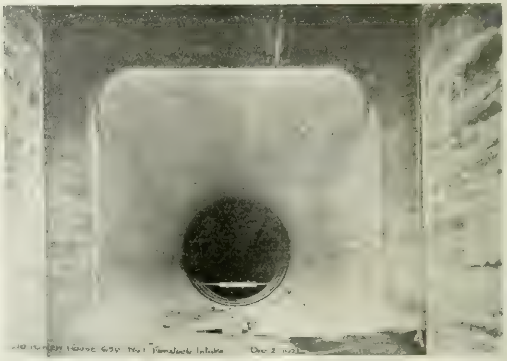
Removable Gates for Penstocks

In view of the fact that a Johnson valve is being installed at the lower end of each penstock, adjacent to the turbine, it was decided to omit permanent gates in the screenhouse at the penstock entrances. To take care of any failure in the valves, removable structural gates made up in sections are provided which can be lowered into any penstock entrance by means of an electric travelling crane in the screenhouse.

The quantity of water used by each turbine at full load and under normal head is approximately 1800 cu. ft. per sec., and in the design of the penstocks, the diameter was fixed by plotting up various curves showing the value of power lost due to varying velocities and their consequent friction losses as against the carrying charges on the corresponding penstocks. By this means a diameter of approximately fifteen feet was found to give the best value, but so great a diameter at the lower end required a plate thickness of over 1½ inches and this was considered beyond the limit for safe field rivetting. On this account the diameter of the upper two-thirds of the pipes was made 16 feet and the bottom third 14 feet which made the construction work feasible and at the same time gave the desired economical results. The loss is considerably reduced by the use of butt girth joints with an outside cover plate as against the customary practice of using inside and outside courses.

Johnson Valves

One of the figures shows a longitudinal section through the Johnson hydraulic operated valve located at the lower end of the penstock. The operation of these valves is very simple, no outside power being required, the valve being opened or closed by means of the penstock pressure. The valve plunger is of the differential type and seats against a ground fit ring in the neck of the body. The annular chamber A and the central chamber B are connected through a control valve and piping either to the penstock pressure or to the atmosphere. Admitting penstock pressure to A and atmosphere to B opens the valve while the reverse operation closes it.



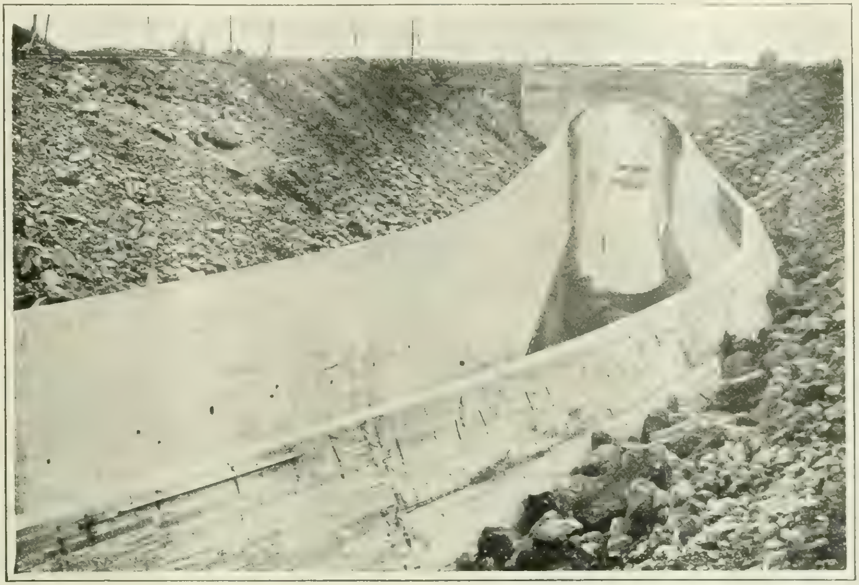
Close-up view of penstock mouth

The advantage of a valve of this type is its simplicity of operation. Furthermore, because of its circular section it can be built for any head and thus located at the lower end of a penstock, obviating by this arrangement the necessity of emptying and filling the penstock for each shut down.

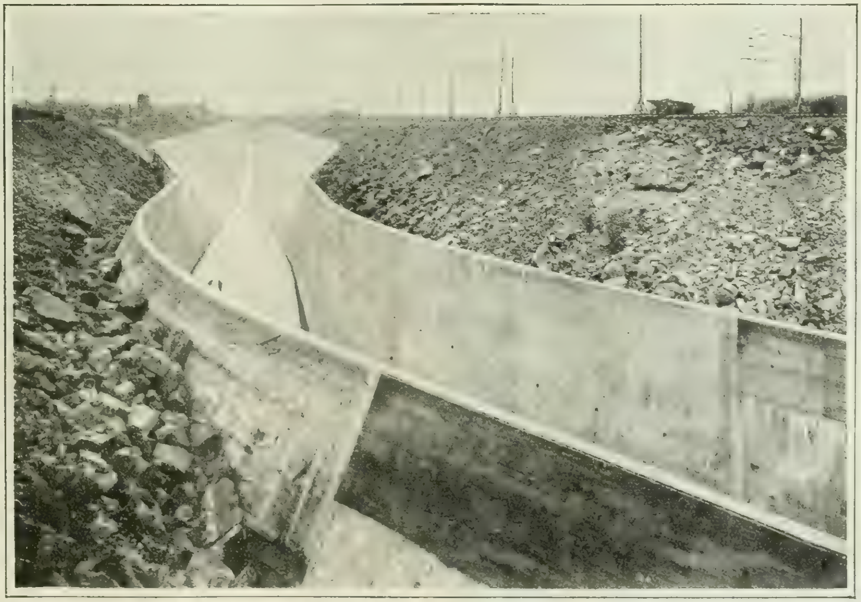
Turbines

Five turbines are at present under contract, two of which are completely erected. They are each of 50,

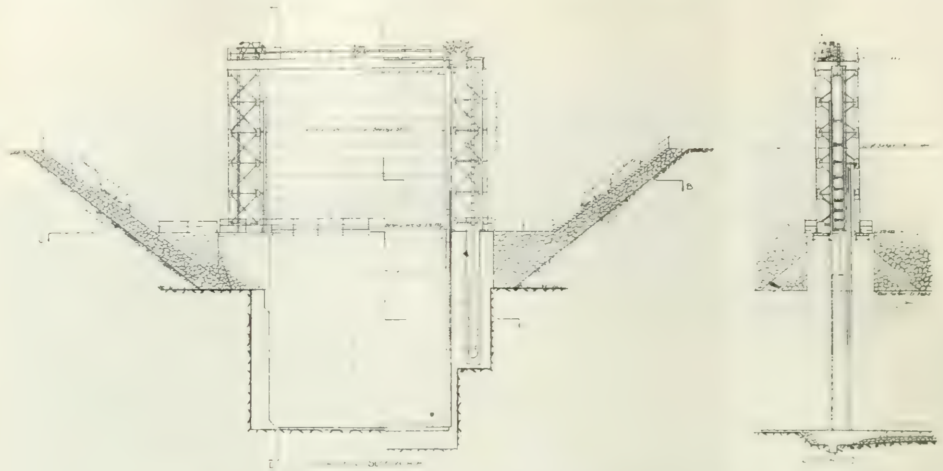
Two Views of Finished Queenston-Chippawa Canal



Curve on canal showing retaining walls above concrete lining where natural rock surface lies below water level



Power Canal showing change in shape of the canal as it passes from vertical faces of rock cut to sloping sides of Whirlpool section



Elevation and Section main control gate, located in rock section of canal near its junction with Chippawa creek

000 h.p. rated capacity and of the vertical spiral case, single runner Francis type and will operate at a speed of 187½ r.p.m. This gives a specific speed of 36. The maximum guaranteed efficiency is 90 per cent, although in view of recent practice it is expected that this efficiency will be exceeded. On model runners of homologous design tested at Holyoke 91 per cent was obtained. The inlet diameter of the scroll case is 10 feet and the diameter of the runner is 10 ft. 5 in. at the inlet. An open space has been left in the power house foundations below the runner, so that by removing a section of the draft tube the runner can be taken out from below, thus obviating the necessity of dismantling the generator when a renewal of the runner is necessary. The runner is designed for a capacity of 61,000 h.p. and is "gated back" to a maximum capacity of 55,000 h.p. The reason for this is that the turbines, which will normally operate at or near full rated load, will also therefore operate at their maximum efficiency.

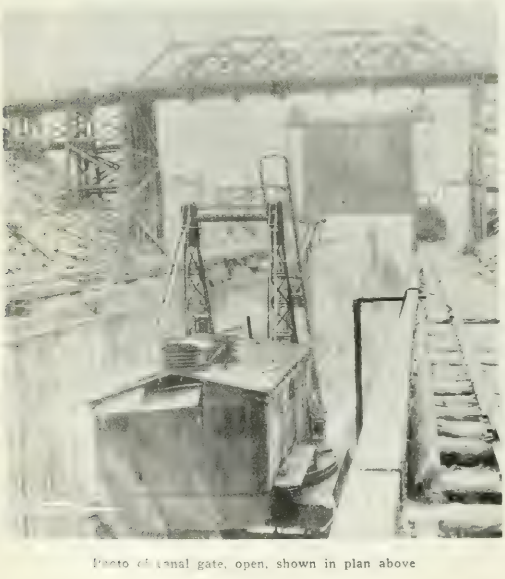
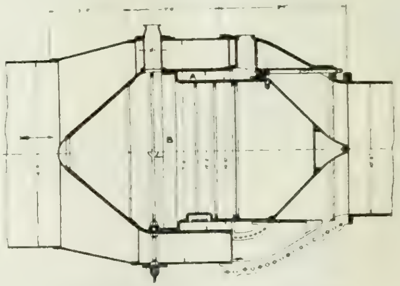


Photo of canal gate, open, shown in plan above

Governor System

The centrifugal head, relay valves, and hand control for each governor are located on the generator floor while the main automatic valve control is located directly under the governor stand at the level of the turbine regulating cylinders. The advantages of this arrangement are the short piping between the main valve and the regulating cylinders and the separation of the two main parts of the governors, giving freer access for repairs and maintenance. The pressure fluid is water, treated with soluble oil, which will prevent rusting of the wearing parts and at the same time give a lubricating value to the water. A central pumping system is used, with duplicate motor driven multi-stage centrifugal pumps, either one of which has sufficient capacity for all the governors. The pressure fluid will be piped to all the governors through accumulator tanks, one located near each governor so as to eliminate any inertia effects through the piping system. The pump motors



Longitudinal section through Johnson valve are automatically controlled by relay switches which are controlled by pressure variation in the system. As a further safeguard for preserving continuous operation, in the event of failure of the pumps or motors, penstock pressure can be turned into the governor system. When the plant is finally extended to its full capacity a complete duplicate pumping system, similar to the one above described, will be installed and interconnected with the present system.

Control Pedestals

A control pedestal will be set up adjacent to each generator, and on this will be mounted the various indicating instruments and control handles. The principal use for such an arrangement is that the communicating devices between the floor operator and the chief operator in the control room, together with the local control and indicator, will be located in such a way that the floor operator can handle the machine while in touch with the chief operator.

Service Units

For furnishing heat, lights, and power service to the plant two service units, each of 2500 h.p. capacity are being installed. Each of these consists of a vertical turbine running at 500 r.p.m. direct-connected to a generator. The turbines are supplied by a single 5 foot diameter penstock branching into two pipes at the turbines, each branch being provided with a Johnson valve. It is expected that the service plant will be duplicated when the power house is completed to its full capacity.

The Coal Equivalent of Water Power

By H. E. M. KENSIT, M.E.I.C., M.A.I.E.E.

In relation to the value and benefits of water power development and the tendency to ever rising cost of coal, the question of the average saving of coal by water power development has recently received considerable attention, and it is of interest to review recent studies of this matter.

In the case of an individual plant the conditions are known and the comparison can usually be worked out fairly accurately, so that no special remarks are called for.

What is of special interest is the result that can be anticipated from a general policy of water power development over a large industrial area, and it is in this connection that the following particulars are given. In such a case the study must include all uses of power and such may be broadly divided into public utility purposes, manufacturing industries and railroad electrification.

One of the most complete studies that has been made is that of the United States Superpower Survey of the region between Boston and Washington.[*] This region, approximately 450 miles long by 100 to 150 miles broad, with an area of 45,000 square miles and a population of about 25,000,000, is less than 5 per cent. of the total area of the United States, but contains 70 per cent. of the total industrial development and uses 40 per cent. of the total coal consumption, and is therefore an intensive industrial district. Within the zone there are 558 electric utilities, 18 railroads and 96,000 industrial plants, 76,000 of which use power and average 350 horsepower each. The 18 railroads represent 36,000 miles of single track, of which 19,000 miles can be profitably electrified. Practically all conditions obtaining in a manufacturing country are therefore represented. The power survey is a broad one and it appears to have received very detailed examination.

The horsepower in use is as follows:

	Total	Per Cent.
Factories	5,850,000	34.4
Public Utilities	4,150,000	24.4
Heavy Railroads	7,000,000	41.2
	17,000,000	100.0

It was found that the average coal consumption in electric power stations in the area is 4.7 lbs. per kw.h. (3.5 lbs. per h.p. hour), in steam locomotives, 9 lbs. per kw.h. (6.72 lbs. per h.p. hour), and that the average factory uses more, some of them more than 20 lbs. per kw.h. (15 lbs. per h.p. hour).

If we take the average consumption in factories at 12.5 lbs. per h.p. hour, the mean of the above results is 7.93 lbs. per h.p. hour, and this at a 33 per cent. load factor is equivalent to 11.5 tons per h.p. year.

In Great Britain the subject was examined by the Coal Conservation Committee of the Ministry of Reconstruction, and its final report (Cd 9084, 1918) stated that figures based on the last census showed that if 75 per cent. of the total coal used in industry was used for power production it gave a figure of 8.03 lbs. of coal per h.p. hour, that since that time greater efficiency had been obtained, that the records of the large power companies in the North East Coast Industrial Area showed that the average coal consumption of present power users before the adoption of electric driving had been 7 lbs. per h.p. hour, that these power companies themselves used but 1.54 lbs. per h.p. hour, and that "accordingly the present consumption for the country as a whole is taken at 5 lbs. of coal per h.p. hour instead of the actual figure of 7 lbs." This, it will be seen, is on account of the results obtained by large power companies operating over extensive areas.

The Hydro-electric Power Commission of Ontario examined the matter of average coal consumption with some care, but on a less extensive scale. Its "Report on the Rate of Coal Consumption" published in 1918 gives a careful digest of the results obtained from 73 central stations of all sizes in Canada and the United States, and from 135 industrial plants in the Niagara district; special care is being taken to include only those plants that used coal exclusively and used it for power only. The average result obtained from both central stations and industrial plants was 6.85 lbs. per horsepower hour, which on a 33 per cent. load factor is equivalent to 10 tons per h.p. year.

These three extensive investigations may be summed up thus as regards general results in industrial districts before extensive systems of central station distribution over large areas are installed:

United States	11.5 tons per h.p. year
Great Britain	7.0 tons per h.p. year
Canada (mainly)	10.0 tons per h.p. year
Average	9.5 tons per h.p. year

so that 10 tons may be taken as a safe round figure for estimating purposes.

The Saving of Coal

It is now to be considered how this figure should be applied in estimating the saving of coal due to water power development.

With respect to coal consumption per h.p. it is only in the case of public utilities that the horsepower actually used on the load is closely known—in the case of factories and steam railroads the coal used per horsepower is usually based on the installed or rated h.p. of the plant, which usually has but little margin over requirements, and from the table given above of the distribution of load in the United States it will be seen

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[*] Professional Paper 123, United States Geological Survey Washington, 1921.

[illegible] peak capacities represent less than one [illegible] of the total horsepower used. Therefore, for approximating purposes it may be taken that coal consumption per horsepower represents the consumption per installed horsepower.

In estimating the coal equivalent of water power, therefore, the calculation should not be based on the average power the stream will develop, but on the horsepower of plant that will be installed to meet the maximum requirements, as this will more nearly correspond to the conditions obtaining in the steam power plants over a large area. Investigation will show that in water power plants the installed horsepower is on the average at least 50 per cent. greater than the minimum capacity of the stream, this being due to the fact that the pondage reserve of water created by the dams and load factor enable temporary peak loads to be carried that are far above the nominal capacity of the stream. It is not considered necessary for the present purpose to treat these well known facts in technical detail.

10 Tons per h.p. Year

In calculating the coal equivalent of water power over a large area or over the country as a whole, therefore, the 10 tons of coal per h.p. year should be multiplied by the horsepower installed or estimated to be installed at the water power plants.

To illustrate this, the figures given for Canada in evidence by the writer before the Special Committee of the House of Commons on the future fuel supply of Canada during the session of 1921 may be quoted.

It is there shown that the total coal consumption in Canada in 1920 was 35,227,000 tons, that the total developed water power actually in use at that time was 2,214,721 h.p., equivalent to 22,147,000 tons of coal, most of which would otherwise have had to be imported, and that at the average price of $8.32 per ton this represents over $183,000,000 per annum.

It is also shown that, looked at from another point of view, the consumption of coal per capita is 50 per cent. less in Canada than in the United States, although the colder climate might be expected to lead to an opposite result; that this is mainly due to the water power development per capita being 194 per cent. greater in Canada than in the United States, that the resultant saving in coal is now equal to $146,500,000 per annum, and that from the national point of view this is equivalent to a return of 27.5 per cent. per annum on the capital invested in water power development.

The Complex Nature of a Modern Telephone Plaut

At a recent meeting of the Montreal Electric Luncheon, Mr. N. M. Lash, chief engineer of the Bell Telephone Company, delivered an address on "The complex nature of a modern telephone plant." At the outset Mr. Lash dealt a body blow to that well-known fallacy that, as a telephone system grows, the cost per unit, of giving service should go down. As more subscribers are added and more expensive and intricate equipment is added, costs invariably go up and not down. Increased traffic, with greater first cost, power consumption and maintenance charges, all contribute to this result. As towns grow, Mr. Lash showed, bigger switchboards, more expensive land and buildings are needed, with bigger power plant, more complicated apparatus, more extensive underground and cable systems and heavier traffic loads requiring more operators. Lines to subscribers are longer, fewer lines must be assigned to each operator, and cost of installation and maintenance becomes greater. When a city requires more than one central office, trunking facilities between them add greatly to cost. Toronto, for example, with its eleven central offices, requires wire, for trunks alone, sufficient to [illegible] the earth [illegible] times. All these factors of ever increasing intricacy involve increased first cost per line, increased operating costs and increased maintenance and annual charges.

Mr. Lash showed how in his department engineers plan 15 to 20 years in advance of a city's growth so that telephone facilities, especially underground, and cable distribution, may keep pace with demand. The remarkable accuracy of these estimates was shown from the fact that it is never necessary to dig up a conduit to increase its capacity. The average efficiency of these plans was said to be 92 per cent correct, really absolutely correct for all practical purposes. To keep ahead of demand, there must be a vast investment in spare plant—more for fast-growing than for slow communities! When it is necessary, for lack of capital, to postpone the opening of a new central office, there are always big expenditures necessary for temporary construction. If the work cannot be laid out 3 and 4 years ahead and orders placed for equipment and initial steps taken, costly duplication of plant and expensive construction are inevitable.

Long Distance Service

Mr. Lash next dealt with the wonderful development of the long distance system, citing cases in which open wire must soon give way to wires in cable to care for heavy demand. The actual productive talking time on long lines was constantly being increased as a measure of economy and operating efficiency improved, but each advance along this line called for bigger expenditures in new equipment. The demand for longer and ever longer talks has meant greater refinements in methods and required apparatus costing much money. It is only the cumulative effect of scientific devices that makes such long talks possible, and to apply new devices and inventions to the long distance network invariably means extensive rebuilding of both inside and outside plant. The problem is one of infinite delicacy—not of power! Maintenance and repairs call for the highest quality of engineering, supervisory, mechanical and technical skill. The standard must be kept high, else long talks would be impossible.

The speaker emphasized the need for adequate rates for service if the public demands for extensions were to be met. It is only in the public interest that earnings should be such as always to attract new investors to put their money into the telephone business. The millions needed for extensions to meet demand could be secured in no other way! Not less than 12 to 14 millions of new money is needed every year to meet demands for telephones and provide an adequate margin of spare plant. If the public once realized that the cost of giving service really does increase as the plant grows and understood some of the complications involved in a large modern telephone plant designed to maintain a high grade of local and long distance service, universal in its scope, they are fair enough, Mr. Lash believed, not to oppose a fair schedule of rates.

Following Mr. Lash's talk some splendid moving pictures were shown that gave his audience a better appreciation of a telephone system than perhaps could be gained in any other way.

Mr. Lash also addressed The Electric Club of Toronto on February 22. His subject on that occasion was slightly different—"A Growing Telephone System"—but the general data was along similar lines. The members were highly pleased with Mr. Lash's address.

L. C. Barbeau & Company, Limited, have just taken over the top floor of 320 St. James Street, Montreal. for their offices and rooms.

The Easy Washer Company are opening a store at 409 Yonge Street, Toronto, where they will demonstrate and retail their electric washers.

The Development of Wireless-III

A Series of Short Interesting Articles Covering Wireless Progress to Date

By F. K. DALTON

Capacity and inductance are the important properties in an electrical circuit which determine its resonant frequency. These terms may be defined as follows.

"Capacity" (C) is the ability of all conductors or metal parts to hold a charge of electricity: the quantity in the charge is proportional to the voltage applied and a slight change in voltage is accompanied by a considerable current flowing into or out of the parts being charged, hence a tendency to establish a current instantly upon a variation in voltage.

In the wireless apparatus capacity is added in the form of condensers, being plates or sheets of some metal, which are insulated from those adjacent but alternately connected to one or other electrical terminal. Thus large surfaces are presented, and this is one essential in obtaining capacity.

"Inductance" (L) is that property of a coil of covered wire whereby it tends to prevent any change of current through it. A change in voltage is followed by a comparatively slow change in current. This effect is the opposite of that found in a condenser.

The inductance increases roughly as the square of the number of turns, i. e., doubling the number of turns gives four times the effect.

"Resonant Frequency" is that frequency of reversal of current at which the retarding effect of the coil equals the assisting effect of the condenser; then the current that will be built up is limited only by the resistance, (a property of the materials of which the conductors, wire and plates are made).

The formula for this relation is,

$$\text{frequency} = \frac{0.159}{\sqrt{LC}}$$

where L and C are expressed in their usual units, i. e., henrys and farads, respectively.

Now the length of the wave is equal to the velocity of its propagation through space divided by the frequency or

$$\text{wave length} = \frac{\text{velocity}}{\text{frequency}} = \frac{\text{velocity} \times \sqrt{LC}}{0.159} = K\sqrt{LC}$$

where K is a constant including velocity which we know is fixed at 188000 miles per second.

Since resonant frequency, and wave length, depend upon the product of the coil effect (inductance) and the capacity, there is an unlimited variety of values of L with corresponding value of C to give a particular wave length, also, either L or C may be variable, (the other fixed) or both variable if preferred, to give us a range.

In a tuned transmitter, the spark occurs in a circuit containing both inductance (a coil) and capacity (a condenser). The coil is placed in proximity with another coil which is connected between the aerial and the ground wires, the aerial forming capacity, and thus a tuned circuit. Then the "spark circuit" and aerial circuit are tuned, adjusted so as to have the same resonant frequency. This results in a pure wave with maximum power being radiated, and reduces the interference of this station with others to a minimum.

In the receiver, a circuit containing a coil and condenser is tuned so as to be in resonance with the transmitter of the station which it is desired to "read" and the voltage built up in the coil and across the condenser is carried to the detecting device.

The receiving aerial obviously receives simultaneously the waves from many stations but it is only the waves at a particular frequency which build up an appreciable current in the tuned circuit. All other waves, unless very strong, pass through to ground unnoticed, causing absolutely no interference. By tuning alone, the workable distances have been very much increased.

It must be understood that the writer has attempted to describe only the simple systems, showing the fundamental principles. In long-distance commercial stations much more elaborate schemes are used for both transmitting and receiving.

In the case of a string giving forth sound of a certain pitch, it was stated that this pitch depends upon the constants of the string such as material, tension, length, etc., and that each time the string was plucked the same note was heard but that the sound gradually diminished in intensity and finally died out altogether. In just the same way a spark starts a current in a tuned circuit and this current gradually diminishes although keeping the same frequency. This is termed a "damped" wave, the rate of dying down depending upon and varying with the resistance of the circuit.

Obviously the most energy, equivalent to the loudest sound, is in the first cycle. The damped wave attempts to get the current in the tuned circuit of the receiver built up immediately and if the damping be excessive its effect will be much the same whether this receiving circuit be tuned exactly to the transmitted wave length or to some other wave of a different length.

A station radiating a highly damped wave will then interfere over a considerable range in wave length and is very objectionable for this reason. Lightning causes a highly damped wave of great strength and is therefore the worst offender.

The importance of wireless communication for ships at sea with the necessity of keeping interference at a minimum has been the cause of the making of a number of laws regarding "damping" and a limit has been set. A station is breaking these laws if its wave dies out in less than a given time.

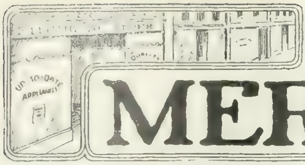
Spark stations at first used the well known spark coil, but in order to get higher power and greater distances, transformers were employed. These were designed with high reactance in order not to draw too great a current when the spark occurred, short-circuiting the high voltage winding. The spark gap at first was a simple one consisting of two rods with a small air space between. The received note from such a gap is high in pitch and hard to read, and as a result a rotary gap was employed. In this device an arm revolves between stationary points and a spark occurs whenever an end of the arm passes a point. The sparks and wave groups are thus broken up and a lower note obtained; this note being adjustable at the transmitting end only.

Let us now consider the manner in which the crystal acting as a rectifier of current becomes a detector of wireless waves.

The damped waves from a spark station are picked up by the aerial and a current in the tuned circuit results. This current is alternating, and its average value is at all times zero. If it were turned directly into a "phone" no sound would result for several reasons—(a) the frequency is above the range of sound; (b) the diaphragm cannot respond to such high frequencies; (c) the coil in the phone acts as a choke and would only allow very little current to pass.

By rectifying the current we do not change its frequency but we change its average value, and make the half wave consist of two parts, one the normal high frequency, the other a frequency equal to the number of wave trains or groups of waves. If the rotary gap of the transmitter gives us one

(Concluded on page 45.)



BETTER MERCHANDISING

Ten Years From Now?

The merchandising of electrical equipment is in the balance.

Ten years from now—through what agency will electrical appliances be reaching the public?

It may be the hardware man—or the department store—or the druggist—or the furniture dealer—or all of these.

Or it may be the Electrical Store—almost exclusively.

That's why our business is in the balance. It may develop along many different lines—there are arguments in favor of each. If it is profitable, each trade will make a bid for it.

It's little use to argue that the electric store is the **logical** channel and that it's bound to work out this way. Isn't it logical that the furniture store might sell floor lamps; that the seller of carpets might sell vacuum cleaners; that the merchant who retails coal stoves might also sell electric stoves?

The only **really logical** phase of the whole situation is that this business should, and will, gravitate in the direction of the trade that is most aggressive in its development.

And in this one respect the electrical merchant has the lead—he, alone, realizes the possibilities. To that extent his competitors are handicapped. For that reason he has more than an even chance to hold the lead.

Don't let us make the mistake, however, of thinking this appliance business is ours by divine right. It's **anybody's business.** If the electric merchant as a class makes a determined fight he can establish himself, within the next ten years, in the minds of the public, as the one and only reliable and desirable source of supply.

But, if he fails to make that fight—?

Following up the Advantages Created by Lively Electric Home Campaigns

The "Electric Home" Exhibit Leaves the Housewife's Mind in a Receptive Mood—She Wants to Learn More—Contractors and Dealers are Following up The Lead

At various points in Canada, at the moment, there is an epidemic of "Electric Home" campaigns. Toronto has it; so has Montreal; Hamilton is getting it; so, they say, is Sarnia; Kitchener, likely, too. East and West, it's spreading.

Why all this sudden interest and enthusiasm?

The fact is that the industry has hit upon something that catches the popular fancy. Every woman is interested in her home—so are most men. The Electric Home, tastefully decorated, neatly finished, wired for the use of every convenience and comfort, touches a responsive chord in the home-lovers' hearts and sends them away feeling that there are many places in their own homes where another outlet should be installed.

The big thing is that the men and women go away from these exhibits in a mood that is entirely sympathetic to electric outlets and appliances and to anyone who may approach them regarding these matters. The people may not, in the majority of cases, be sufficiently enthusiastic to approach the contractor or merchant to buy these things—though a percentage will even do this—but they are all ready to talk about electric outlets and appliances, if the matter is broached to them in a diplomatic way.

For example, the Electric Home makes it possible for the contractor or dealer to call any of his old prospects on the telephone and be assured of a considerate hearing—or to get an easy entrance into the home of a prospective customer for a vacuum cleaner, washing machine or whatnot.

The people are ready to discuss, ask questions and benefit by instruction where formerly they were merely "not interested."

The ultimate value of these exhibitions will thus depend on the policy of the contractors and dealers—on the extent to which they follow up their advantage. A number of contractor-dealers have put salesmen out whose business it is to locate prospects and follow them systematically. One often hears it said that "you can't get salesmen," but in one case brought to the writer's attention a newspaper advertisement brought more than half a hundred replies from which eight or ten really live young men were chosen that are since "making good." For the selling of appliances, it doesn't require a man highly versed or experienced in electrical matters. He needs, rather, a good address and the ability to inspire confidence. It goes without saying that he must be an enthusiastic believer in the articles he is selling.

Canada Due For Burst of Home Building

Accumulated Shortage Will Force Construction Activity in Immediate Future—Every Home Should be Fully Wired and Equipped Electrically

The Society for Electrical Developement has been gathering statistics in the United States regarding the number of houses wired, and places the total at 7,636,409. On the supposition that the population of the United States is 110,000,000, and the average family consists of four persons, there should be 27,500,000 homes. Thus, there are only 25 per cent. of the homes in the United States wired and supposing, again, that only 50 per cent. of the total are within reach of electrical supply (that is a very low estimate, of course) the conclusion is that less than half the houses that ought to be wired have actually been equipped for even electric lighting. This point again emphasizes the great possibility in old house wiring.

The Society figures that the number of houses wired during the year 1921 was 1,001,700; that of this number, 700,000 were old and 301,700 were new. They also estimate on an increase of 25 per cent. during 1922. These figures are given to show, not only the very large number of wiring contracts available for the electrical contractor, but also to indicate that electric merchants were provided with a very fertile field for the sale of their appliances. Their final figure is that 8,500,000 homes in the United States need better fixtures and more appliances.

Figures in Canada do not check up exactly in proportion to the population, but the comparison is interesting, nevertheless. According to the most authentic reports, 16,000 new homes were built in Canada during 1921. There is every indication, however, that this number will be tremendously increased during 1922 for statistics also show that there were 110,000 marriages. 94,000 extra families must be taken care of in some way, and while the apartment house will do its share, the inevitable result must be that home building in Canada will see a very marked increase during the next few years.

Just for the sake of argument let us suppose that in Canada 110,000 new families were in a position to wire their homes and buy electrical equipment. Putting the wiring at $100. and the electrical appliances at the same amount, the purchasing power of these new families is $22,000,000.

Do we realize yet the possibilities in this electrical business? Do we realize, it may also be asked, how closely this development is tied in with ample home accommodation? In the construction industry the prospects for great activity are very bright. Money is cheaper and will, naturally, be looking towards mortgages at 7½ per cent rather than 5 per cent. bond yields. Rents are higher today than they have been at any time between now and 1914. The costs of building material, in general, have been reduced, perhaps, 25 per cent.

Don't let us be caught napping. Every new house that is built should be wired to the extent of from 3 to 5 per cent. of the total cost of the home—and that just paves the way for equipment sales to begin.

Bonspiels—Yesterday and To-day

Electric Illumination Has Magnified, a Hundred Fold, the Glory of Canada's Unique Outdoor Sport— Winnipeg Carnival a Blaze of Glory

Winnipeg, the Gateway to the West, held its first winter carnival at the same time as the famous annual Bonspiel—during the week, February 6th-11th. Electricity played a most important part in making the event a success, and was the subject of much favorable comment by the thousands that visited the grounds. The Carnival program consisted of many winter sports. pageants, parades, crowning of the Carnival Queen, mocassin dancing and stunts by officials of Hickville, whose band, police force, and fire brigade provided plenty of amusement. The program continued until 11 p.m. daily and therefore the matter of lighting had to be given careful consideration to ensure the public being able to properly view all the events. It was also thought desirable to make the grounds attractive by the display of plenty of light.

Flood Lighting on Parliament Buildings

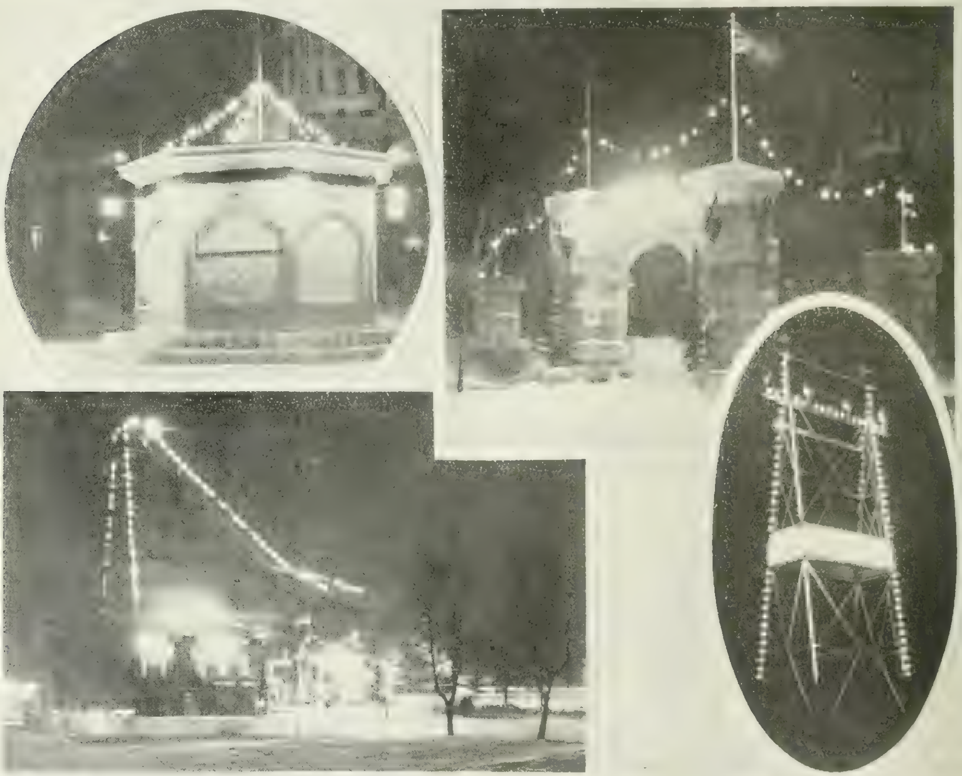
The Carnival was held on grounds adjoining the new Parliament Building. The dome on this building is about 240 feet high, and is permanently lighted by flood lights mounted at intervals on the main roofs. They throw light up to and all around the dome.

The steps at the west entrance to the Parliament Buildings were used for the coronation of the "Queen", and her reception each evening. Her court and retinue consisted of hundreds of attendants, horses, etc., which occupied a space about 100 feet wide, the steps forming the throne.

For lighting this space, 4-1000 watt floods were erected on the roof of a bandstand about 200 feet distant; here also was a large movable search light loaned by the "Free Press"; this was used to light the throne or scenes of interest on the grounds.

Illuminated Ice Wall

The entire grounds were surrounded by an ice wall, con-



Upper Left—Illuminated Band-stand, Winnipeg Winter Carnival, note ice-block foundation, Manitoba capitol buildings in background.
Lower Left—Illuminated ski slide with flood light at top, building in the foreground erected and used as one of the fun making features of the Carnival and labelled "Hickville."
Upper Right—Main gateway of the Carnival grounds, constructed entirely of ice and illuminated by the Winnipeg Hydro-electric System.
Lower Right—Electrically illuminated transmission tower erected by the Manitoba Power Co

sisting of ice blocks about 6 feet high, standing on end, at intervals of 33 feet were ice pillars about 4 feet by 8 feet high.

Evergreen trees 5 feet high were placed at intervals of 3 feet on top of the wall and pillars. For lighting the wall, festoons were used—about 1500 feet in all, 25 watt lamps being placed at about 2 feet centres. These were in the Carnival colors of red, green, and white and looked very pretty mingling among the trees.

Lighting of Band Stand and Dressing Rooms

The main entrance was the old Fort Osborne gateway, which was decorated by festoons across the top and 6 streamers down the front, of colored lamps.

The bandstand was in the centre of a huge rink used for moccasin dancing. This building was octagonal in shape and the exterior was decorated by 8 streamers from a central flagpole down to the roof corners, these being illuminated by colored lamps, 25 watt, 15 inch centres. For exterior lighting 8 brackets were projected about 4 feet on which were supported No. 402 "Lumo" balls and 300 watt nitro lamps. The interior was lighted by 100 watt lamps suspended from the ceiling.

A building 280 feet long used for dressing and check rooms, concessions, etc., was lighted by lamps projecting over the cornice, these being set at 2 foot centres. The tower on this building was lighted around the top and on each corner by lamps at 1 foot centres. About 300-25 watt colored lamps were used on the entire building.

Ski Slide—General Illumination and Toboggan Slides

The ski slide was lighted by 4-1000 watt flood lights, 2 at the top and 2 midway down the slide. For decoration, 2 streamers were run up the 120 foot tower over the top, and held by flagpoles. At intervals above the handrail—each side of the slide—25 watt colored lamps were used at 15 inch centres.

The toboggan slide and towers were a brilliant spectacle. On each tower was a 1000 watt flood, lighting the slide and the entire 900 feet runway. 15 watt colored lamps were placed at 15 inch centres, suspended about 9 feet from the ground.

The general lighting of the grounds was accomplished by means of flood lights, about 30 being used, mostly 1000 watt; these were mounted on poles or tops of buildings, and, being adjustable, could be swung to any desired position.

Manitoba Power Company's Display

An original idea was carried out by the Manitoba Power Co., who erected one of their 45 ft. steel transmission towers, on top of which were placed 6-1000 watt flood lights. The tower was outlined with solid rows of lights, and about half way up were bands around the tower consisting of many rows of red, white and green lamps; over 1200 60 watt lamps were used. The Winnipeg Electric Railway Co. supplied this current. The idea was to typify the coming to Winnipeg of more power, which work the company is now engaged in.

Advertising which was carried out by the company in a plan which linked up with the tower notified all carnival visitors that power from the company's 170,000 h.p. plant on Winnipeg River would be available for industries in Winnipeg in 1923.

The tower was erected under the supervision of D. K. Lewis and M. C. Gilman, of the Winnipeg Electric Railway Company.

Winnipeg Hydro Display

Winnipeg Hydro-electric erected a huge arch and 2 pillars of ice. Surmounting the top were festoons of colored lamps. On either side of the arch was a sign, announcing the name, the letters being outlined with 50 watt nitro, blue sign lamps, which showed up to great advantage. Current generally was supplied by the Winnipeg Hydro who charged for service only, contributing the current.

The Queen's [illegible] Moffat grate and twenty three kilowatt air heaters, while the lighting consisted of beautiful silver plated candle fixtures and brackets, the product of the Standard Bronze Company, Toronto. J. R. Aikman [illegible] time to make this display most attractive.

Let by Contract

The electrical work was let by tenders, the contract, amounting to approximately seven thousand dollars, being awarded to McDonald & Willson Lighting Co., Limited, Winnipeg. The contract included maintenance and removal of the system. The same company bought the salvage by bid.

There was a remarkable absence of trouble, one fuse being blown by a wagon backing into and breaking a festoon on the ice wall. Fred Shipman had charge of the contract work and is to be congratulated upon the splendid display.

Materials Used

Several services were brought into the grounds; these were controlled by Langley externally operated switches. Mains were 3 wire, 110-22 volts a.c., and all branch circuits 110 volts, 2 wire, not exceeding 1500 watts.

Wiring was open work on knobs or cleats; Norbitt 118 decorative sockets were installed with Laco lamps. Davis flood lights were used.

The entire load amounted to about 250 kw. The contract provided work for 15 men for about three weeks, and was completed 2 days ahead of schedule and dismantled in 1 day.

Canadian National Carbon Co. Appoint New General Sales Manager

Mr. Alexander MacKenzie was recently appointed general sales manager Canadian National Carbon Company, Limited, and Prest-O-Lite Company of Canada, Limited. Mr. MacKenzie joined the staff of the Prest-O-Lite company in 1917.

Mr Alex MacKenzie

After some months in the head office in Toronto, he took charge of the Montreal office and service station of the Prest-O-Lite company and built up large and profitable branch business in Quebec. On August 1st, 1920, he was made sales manager of the Canadian National Carbon Company, Ltd. His work for this company earned for him the promotion to general sales manager of both companies.

There's Big Business for the Contractor in Wiring Old Houses

Most Old Homes are Wired for "Light" Only—It is as Important that they be Entirely Remodelled as that New Homes Should be Fully Wired

With so much attention being paid to the business of wiring new homes, the average contractor has lost sight, perhaps, of the fact that there is much to be done in the way of rewiring old houses. For one reason or another, the contractor fights shy of the old house jobs. There are so many uncertainties connected with it, he will tell you, that it is impossible to form an estimate before-hand of the actual cost of the work, and he runs a big chance of losing money.

A contractor, who has specialized in old house work, recently stated that there was practically no excuse for this uncertainty. He pointed out that too many contractors take merely a casual glance at the situation and "guess" its cost. Possibly they take the precaution of counting the outlets. If they find, as the work nears completion, that they are losing money, they prevail on the owner to cut out one or two or more outlets—"because they are unnecessary."

Light in an old bathroom "where you want it"

Requires Skill but Can be Done

This contractor points out that determining the cost of wiring an old house requires, of course, a little greater skill, experience and engineering ability than the new job requires. If the wiring is to be concealed, it is as necessary to make investigations as an engineer would find it necessary to take borings before fixing the cost of the foundation of a dam or large building. With the necessary care, however, the element of uncertainty can be removed in practically every case.

Then there is the alternative method of cost plus percentage arrangement which many householders will readily agree to when the difficulty of forming an exact estimate is explained to them.

Old Houses in Big Majority

This contractor, however, was emphatic in urging that the "old house" business should receive more attention from the electrical contractor. In the smaller towns, a new house is an event, and even in some of our smaller cities the number of new homes in a year may be counted on the fingers of our two hands. How diminutive the new business looks when compared with the thousands of old homes that are waiting to be rewired

Don't Destroy the Furnishings

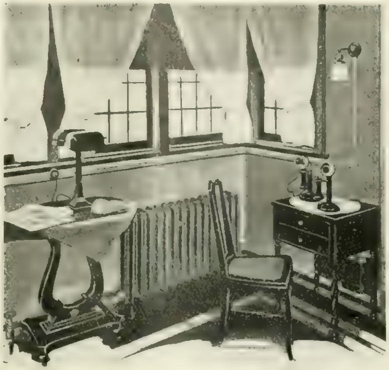
A very real factor entering into the problem of convincing the owner of an old house that he ought to have it rewired is the feeling that the walls have to be torn to pieces, practically, and the whole place badly messed up. To the housewife, comfortably settled, the walls well decorated, floors and furniture well polished and everything placed "just so", the thought of all these things being upset is too repugnant to be easily overcome. In this case it is plainly the first duty of the contractor to convince the housewife that he can do the necessary work without interfering in any considerable degree with the comfort and appearance of her home. In a case of this kind much depends upon the contractor. Some workmen are naturally untidy, careless of the surroundings, careless of personal property; such as these have no business to be engaged in the wiring of occupied houses—or, for that matter, of new houses, either. It is quite possible, however, to do this work practically without injury to the decorations and furniture.

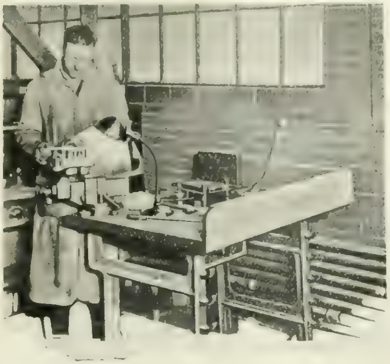
Why not Exposed Work?

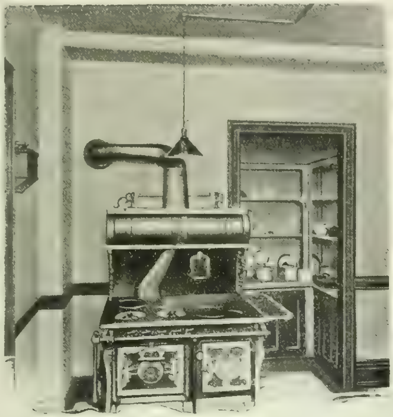
There was, perhaps, a prejudice in the early years of electrical wiring against exposed work. However, there seems very little justification for it to-day. A modern exposed conduit is very inconspicuous and has the added advantage of an installation that costs less, takes less time to install, upsets the household less and is capable of adding a wonderful flexibility to the wiring arrangements. With exposed wiring one can lead the wires anywhere irrespective of joists or stone walls, doorways, chimneys or whatnot that might interfere with the work of concealing the wires in many an old home.

In Canada we don't seem to have realized the possibilities of exposed wiring. To the contractor, it opens a wonderful field. A few feet of molding run along the corner of a room, decorated the same color as the walls, substitutes a baseboard outlet for an inconvenient ceiling outlet. Molding for this purpose, used nowadays, is of most inconspicuous dimensions, the whole molding of one manufactured product, with its three wires, measuring less than ¾ of an inch in width and less than half an inch in thickness. Painted or decorated the same color as the ceiling or walls, or covered with paper at the time the rest of the room is papered, all possible objection to its appearance is overcome.

Typical Examples of Exposed Wiring







Upper left—Table reading lamp from wall outlet.

Upper right—A convenience outlet in the workshop.

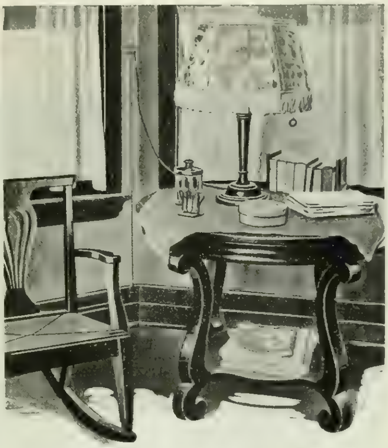
Left—The best of light at the base of operation.

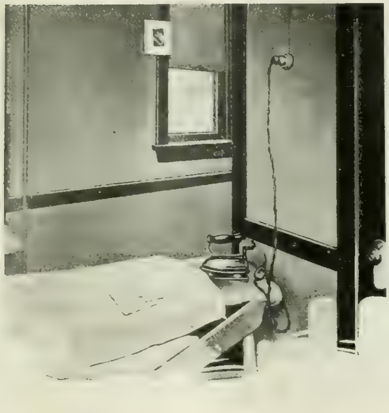
Right—Extra wall outlet for reading and work table.

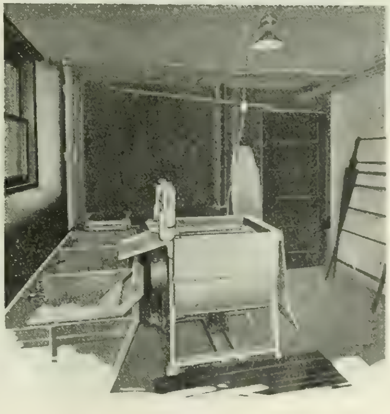
Lower left—Ironing outlet conveniently placed.

Lower right—Ceiling outlet for washing machine; keeps cord off damp floor.

These installations made with "Wiremold."







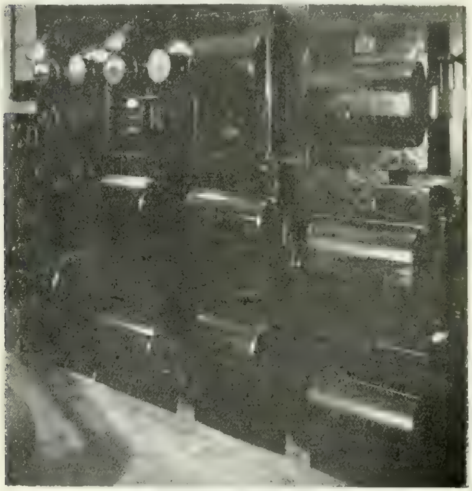
Fine Sample of All Steel Safety Switchboard Installation in Hamilton

By V. K. STALFORD

The regulations which are becoming effective in different municipalities throughout Canada and the United States for dead front switchboards have been the means of introducing a new type of switching equipment for low voltage up to 600 volts a.c. and d.c. designed to meet these requirements. The first condition to be met by the designers was that it had to be sold for the same if not a lower first cost than slate boards had been in the past. They had to be suitable for the same class of mounting such as angle iron frame and wrought iron pipe frame. The panels had to be such a size that they would make up the same as the standard widths and heights universally adopted and at present in use.

The manufacturers of steel safety switchboxes have recently placed on the market steel panels, punched, formed and enamelled, which meet all the requirements for this new type of switchboard. They have been tried out in several of the large industrial plants and several municipal buildings such as schools and colleges and have proven very satisfactory in every way. Some of the large electrical manufacturers are now using them in their plants in place of slate switchboards, as formerly.

The flexibility of the steel panel is a very important point in favor of this new type of switchboard. The panels, with the switchboxes, may be carried in stock and a board can be made up on very short notice to meet the demands in industrial plants where alterations and extensions are made on short notice. This condition is a very important one from the contractor-dealer's point of view, as he is able to take from his stock or obtain them on short notice from the jobber's stock. They can be shipped to the job and made up to suit any requirements which might arise and as is often required, as changes have to be made when the job is nearly completed due to the fact that some condition has arisen which had been overlooked previously. Several of the local contractors have expressed their approval of this type of equipment. The de- [illegible] pment which have been customary in the past with the slate board are entirely eliminated with this equipment.



All-steel Safety Switchboard

The control for groups of small motors up to 5 h.p. may be grouped on boards such as this, making a very efficient and mechanical arrangement.

The accompanying cut portrays an installation in an industrial plant which is operated by a steam engine direct-connected to alternator of 220 volts, 60 cycles. The control for the generator with meters and rheostats is mounted on panels No. 1. The control with meters for the exciter is mounted on panel No. 2. The remaining switches are for feeder control. This type of switch is very desirable for feeder control as it is possible to lock the switches in the off position when it is desired to prevent any circuit from being made alive when work is being done on this particular circuit, thus preventing the accidental closing of switches which so often occurs with other types of switchboards. The question of grounding can be very easily taken care of as the several equipments are all mechanically connected, which makes ideal conditions for good grounding, and by grounding at one point you are sure to have all the equipment properly protected.

The panels are mounted on an angle iron frame similar to the types used for standard switchboard construction, with a channel iron base and channel iron wall supports. The panels are provided with flanges at each end for the purpose of connecting them together. Openings are provided in the flanges for bolting them together. These flanges can be used for bolting the panels to the vertical members of the frame. In the wrought iron pipe frame suitable cross angles can be used if the panels are to be used with this type of frame.

The mains are entirely enclosed in a gutter box, all conduits being connected to this box, which provides a very good bond for the grounding of circuits. It is very convenient to interchange the circuits to the extreme sections of the board through the gutter box.

The cases of meters are all well grounded, as they are bolted to the steel panels. The entire switchboard both front and rear is dead, so that it is unnecessary to provide guard rails or enclosures. Any arcing or heating is retained in the boxes and gutters, which prevents fires being started from the switchboard equipment as is the case with the open type.

Recommendation of Wiring Committee

The Wiring Committee of the N. E. L. A. has for some years been recommending the "solid neutral from the generator or transformer to the lamp."

Originally, electric distribution circuits were insulated throughout. With this method, it was desirable that in case of trouble both the wires of the circuit should be opened by a fuse or switch or circuit breaker whenever the circuit was to be disconnected.

After a while, however, experience showed that the balance of advantage was in favor of a grounded system, and after long struggles permission was given for grounded systems rather than completely insulated systems. To-day, grounding is in many cases compulsory.

In connection with grounded systems it was soon found that if the grounded wire was opened, trouble resulted. This applied chiefly to the middle or neutral wire of a three-wire system. When the fuse on the middle or neutral wire of a three-wire system opens, there are two kinds of trouble. One is that unless the load is perfectly balanced, the voltage, instead of being say, 115 on each side, becomes say, 150 on one side and 80 on the other, the exact figures depending on the load. This, of course, causes lamp burnouts and other injuries.

The second trouble is that if there are two or more ground connections on the system, either intentional or accidental, then when the fuse on the neutral blows, the current, instead of flowing through the neutral wire as it should, may go from one of the ground connections to the other through an improper path.

When these troubles appeared, permission was sought and finally granted to omit the fuse on the neutral wire, since if it did not blow it was no use, and if it did blow it caused trouble.

For some reason, however, the rules, while they permit, and sometimes require the omission of the neutral fuse on three-wire systems, still require two fuses, one on each wire of the two-wire branches from three-wire systems.

In this case, the trouble from unbalanced voltage does not arise. The other trouble, however, from stray current is just the same.

If the fuse on the grounded side of a two-wire branch should blow, then the following may happen.

If high tension current, as 2,300 volts, should in any way get on to the system, then with the fuse on the grounded side blown, the householder can get a 2,300 volt shock. The blowing of the fuse on the grounded side removes the protection of the grounding.

Also if there should be any accidental ground on the two-wire circuit (as there often is), then if the fuse on the grounded side is blown the current goes through the lamps to the accidental ground and instead of returning through the wire intended for it, returns to the main ground through an improper path.

It is true that few troubles arise from blowing of the fuses on the grounded side, since usually the other fuse blows at the same time, but the fuse on the grounded side never does any good; it may do harm and what is also of importance, it costs money. Panel boards in particular can be much smaller and simpler, if the fuses and switches are all single-pole on the potential wires and the neutral wire is made solid throughout.

This construction is required in England, and what means more to us has been for a long time required in Providence, (U. S.), where insurance is freely granted.

The Wiring Committee of the N. E. L. A. is asking that this construction be officially approved in the code, but pending such approval there would seem to be no reason why local inspectors should not allow it in their districts since it is perfectly safe.

The only point to be watched is that the neutral wire should be adequately identified. In the case of the two wire services, there is a possible danger of transposing the two wires, but whenever a three-wire service enters a house this danger practically disappears, and there would seem to be no reason for paying for two-pole cut outs and two fuses when single-pole cut outs and single-pole fuses would be both cheaper and safer.—The Bulletin.

Canadian Electric Supply Co. Have Added New Fixture Department

A new lighting fixture department has been added to the premises of the Canadian Electrical Supply Company, Limited, 165 Craig St. W., Montreal. As seen from the illustration, the lines of fixtures carried are many and varied. The whole general lay out of the light and fixture department is both pleasing to the eye and arranged in such a fashion that it is a very easy matter for the intending purchaser to see at a glance each individual fixture just as it would appear when installed. The side tables, which are used for glass wear, toasters, table lamps, hot plates, irons and portable heaters, etc., are so placed that a demonstration is a very simple matter. Mr. J. C. Sullivan recently appointed sales manager, is very proud of this addition to their showrooms.

The Canadian Electrical Supply Co., have added the attractive lighting fixture department shown herewith

Northern Electric Company, Toronto District, Hold Three-Day Conference

The Toronto District of the Northern Electric Company held a very important conference in Toronto on Monday, Tuesday and Wednesday, February 20, 21 and 22. Meetings were held at the King Edward Hotel, at which were representatives from Toronto, London, Hamilton and Windsor. A number of heads of departments from Montreal were also present, including M. K. Pike, general sales manager; C. F. R. Jones, telephone and wire & cable sales manager; L. A. Johnson, general supply sales manager; William Carswell, chief accountant; W. H. Smedley, general stores manager; G. R. Allerton, general advertising manager, and A. J. Soper, Montreal district manager. Mr. W. R. Ostrom, manager Toronto district, acted as chairman.

The conference concluded with a Banquet, at the King Edward Hotel, on the evening of February 22. In addition to some fifty members of the "Northern" staff, there were also present a number of guests. The invited guests included Messrs. H. S. Balhatchet, vice-president Benjamin Electric Mfg. Company; H. A. Burson, sales manager Canadian Crocker-Wheeler Company; W. J. Campbell, manager Crown Electrical Mfg. Company; H. Eccles, general manager Easy Washer Company; W. N. Elliott, sales manager N. Slater Company; N. E. Geery, sales manager Jefferson Glass Company; J. Herbert Hall, president Conduits Company, Ltd.; T. Kaufman, general manager Square D Company; S. Lynn, factory manager Sangamo Electric Company; E. G. Mack, managing director Crouse-Hinds Company; Alex. MacKenzie, general sales manager Canadian Carbon Company; K. A. McIntyre, Canadian representative Society for Electrical Development; A. L. Page, president Frost Steel & Wire Company; E. H. Porte, general manager Renfrew Electric Products, Ltd.; K. J. Shirton, general manager William Shirton Company, and C. E. Walsh, general manager United Electric Company of Canada.

The evening was given over to community, quartet and individual singing and orchestral selections,—not forgetting the "bones," by Mr. Baulch—but was necessarily brought to a close at an early hour to enable the out-of-town visitors to catch their trains.

An interesting event was the presentation of gold "Eversharps" to Messrs. J. A. Daly of Hamilton, and A. L. Brown of Toronto, who are leaving immediately for Regina and Halifax, respectively. Mr. Pike and Mr. Campbell, in company with Mr, Daly, left the same evening for the West, where conferences will be continued at the headquarters of the company's different districts.

Big Market for Electric Ranges

Electric ranges will be vigorously promoted in Vancouver and vicinity by the British Columbia Electric Railway Company, according to E. E. Walker, its sales engineer. Mr. Walker, in company with W. Saville and P. Gill, two other officials, recently made a circuit of Seattle, Tacoma, Portland and Spokane and were impressed with the growth of the electric range load in these cities.

"We have a total of 600 ranges on our lines," said Mr. Walker on his return, "whereas Spokane, a city with much smaller population, has 3500 ranges. Our cooking rate is 3 cents a kilowatt hour so that there is no reason why the electric range should not be adopted in a much wider manner.

"There is a market, I believe, for not less than 500 electric ranges a year in and around Vancouver and our company is therefore about to institute a vigorous campaign to endeavor to put that number on the line, not only this year but continuously and in increasing numbers.

"We are just completing a new 11,000 feeder line to West Point Grey which will enable us to serve that rapidly growing community. There were 2000 new homes put up in Greater Vancouver last year and this year the number will be 3000. Many of these home builders will be in the market for electric ranges, especially those in the newer sections of Point Grey.

Part of the B. C. Electric Railway Company's plans take the form of a vigorous advertising campaign, while the territory will be divided up among a number of salesmen.

A Good Outlet for Canadian Products

Mr. C. S. Seager, manager of the Auckland branch of Messrs. Turnbull & Jones, Ltd., electrical engineers and contractors of New Zealand, who, as noted in a recent issue, was spending some time in Canada for his firm, has just left for New York. Before leaving, Mr, Seager appointed The George C. Rough Sales Corporation, Coristine Building, Montreal, his Canadian purchasing agents.

Moloney Electric in New Offices

The Moloney Electric Co. of Canada, Limited, are vacating their present office No. 1221-4 Bank of Hamilton Building and are moving into new offices at suite No. 501, York Building, which is located on the north west corner of King and York streets, Toronto.

Mr. A. Bauer of Mitchell, Ont., has taken an agency for the Canadian Fairbanks Morse Lighting Plants, for Mitchell and district, and has also gone into the electrical contracting business

Mr. H. R. Cassidy, 255 Regent St., Montreal, has been awarded the contract for electrical work on two residences recently erected at Roslyn Ave. and Sherbrooke St., Westmount, at a cost of approximatly $30,000, for Mr. Chas. J. Brown, 4263 Sherbrooke St. W.

Messrs. Fox & Mainwaring have been awarded the contract for lighting Cedar Hill School and Strawberry Vale School in the municipality of Saanich; they are also busy fitting up electrical homes for Mr. Ayton on Wilkinson Road, and Mr. Taylor on Newport Ave., Oak Bay.

The Star Electric Company, Kitchener, Ont., have moved from 22 Yonge Street to a new and up-to-date store at 91 King Street West, Kitchener, where they will carry a complete line of electric washers, ranges, vacuum cleaners, etc. Messrs. Bremner & Schnur are the partners of the Star Electric Company.

Trade Publications

Meter service switches are described and illustrated in Circular No. 4484, recently issued by the Westinghouse Electric & Manufacturing Company. The switches are designed to meet every condition encountered by central stations in supplying service to homes and apartment houses and they can be used in connection with standard makes of meters on the market, or independently, if desired. The publication also contains a description and illustration of the Boston-type outfit. Other features discussed are meter trims, end walls and accessories, methods of banking, dimensions and wiring connections.

The Hazard Manufacturing Company, of New York, are distributing a little booklet, entitled "Keystone Wire." The booklet describes the construction and characteristics of this wire, with illustrations.

News from the Maritimes

Nova Scotia Electrical Association Showing Active Interest in Better Lighting

The Electrical Association of Nova Scotia held an important meeting on the evening of February 20. The discussion centred around street lighting, the chief speaker being Mr. C. H. Wright, eastern manager of the Canadian General Electric Company.

The situation in Halifax as regards street lighting is particularly favorable. The power being developed at St. Margarets Bay, which by agreement as explained in our last issue—may be obtained by the city of Halifax, at cost, either from the Tramways Company or from the Nova Scotia Power Commission, leaves the city in the fortunate position of having ample supply at a minimum expense.

The speaker, Mr. Wright, introduced his lecture by tracing the development of street lighting from early times up to the present day. Lantern slides were used to illustrate the various phases in this development. Mr. Wright dealt more particularly, then, with the lighting conditions in Halifax, pointing out that the present system is necessarily out of date, owing to the fact that it was installed many years ago and to the further fact that tremendous development has taken place in illumination methods, construction of glassware, efficiency of lighting units, etc., during the last few years.

He also made a very strong point in connection with the safety features of good lighting, dwelling upon the fact that fatalities from accidents in the United States during the war were very much greater than among U. S. soldiers in Europe due to their participation in the war. Good illumination is the best form of police protection, as well.

The point was also made that the city of Halifax, even under the old system, was paying much less than the average city for its street lighting. It was stated that in Springfield, Mass., the cost of street lighting was $1.20 per head while in Halifax it was only 40 cents per head. The city could, therefore, afford to spend more money than it was doing at the present time and, considering the greater efficiency of equipment that could now be obtained, the amount of illumination would also be in much greater proportion to the money the city did spend.

In the discussion that followed Mr. Wright's address, Prof. Knight of the local Technical College spoke briefly on the benefit of electricity in technical work. Other speakers included City Engineer Doane, and Mr. W. H. Hayes, assistant manager of the Maritime Telephone Company.

Mr. G. H. Durling, city electrician of Halifax, has drawn plans for the illumination of the city streets on a modern scale. These plans were discussed at some length and referred to in a complimentary manner as being very comprehensive and artistic, and quite in keeping with the many other improvements this city has inaugurated from time to time in the past.

The address was preceded by an informal dinner and a short musical programme. Mr. Wm. Murdock, the president, was in the chair. The secretary of the Association is Mr. E. A. Saunders.

The Electric Specialty Co., 781 Granville St., Vancouver, has secured the contract for electrical work on the Bank of Toronto building, Broad and Yates St., Victoria, which is undergoing alterations.

Mr. Fred Dubois, 394 Clarence St., Ottawa, has secured the contract for the electric wiring of a parish residence, recently erected at Anglesea Square, Ottawa, at a cost of approximately $30,000., by St. Anne's parish.

New Manager Halifax District, Northern Electric Company

Mr. Arthur L. Brown, of the Toronto office of the Northern Electric Company, Ltd., has been appointed manager of the Halifax branch of the company. Mr. Brown is almost a newcomer in the electrical industry and the confidence being placed in him by the Northern Electric Company is all the more remarkable. During the war he was connected with the Imperial Munitions Board and was on the staff of the British Munitions Company, Ltd., under J. D. Hathaway, who was president of that company and is also vice-president of the Northern Electric Company. At the end of the war Mr. Brown was engaged for some time in winding up the affairs of the British Munitions Company, after which he was taken on by the Northern Electric Company and sent to Toronto as assistant district stores manager. A little later he was made district stores manager, which position he held up to the present time, when he leaves for the larger sphere in the Maritime Provinces.

Mr. Arthur L. Brown

The Development of Wireless—III

(Continued from page 35)

thousand wave trains per second, this second component will when turned into the phones give us a note, more or less pure, at one thousand sound waves per second. A variation in the speed of the rotary will cause a change in the pitch of the sound received.

The crystal is simply a rectifier, and in its stead have been used several types of electrolytic rectifiers and the original two electrode values which consist of one hot and one cold body both in a vacuum. The incandescent tungsten filament usually forms the hot body, the cold electrode being composed of any one of several metals. These electrodes, known as "filament" and "plate" are placed in a bulb which is later exhausted. With the filament heated and a potential applied between plate and filament a current is allowed to pass through the "value" in one direction only—namely from plate to filament. This device therefore acts as a rectifier, and when used in this capacity for wireless reception gives clear signals.

It is the improvement in this little device, the value that has made possible the present-day signalling across tremendous distances of thousands of miles and has also brought into existence the wireless telephone.

The contract for one 450 h.p. motor has been awarded to the Canadian Westinghouse Company, Toronto, by the Hull city council.

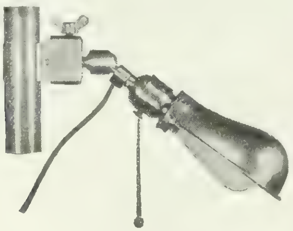
The Latest Developments in Electrical Equipment

Miniature Connectors

The Canadian General Electric Company have placed on the market the cord connector and series tap connector illustrated herewith. The miniature cord connector, on the right, is for use wherever a small separable connection is desired. It is only 7/8 in. wide by 2-9/16 in. long. The fingers are recessed to snap over raised points on the heavy phosphor-bronze spring contacts, making a firm connection. A black composition is used for the outer part of this connector, which has a capacity of 600 watts, 250 volts. The series tap connector, shown on the left, is specially designed for attaching electrically operated sewing machines. Its material, finish, design and operation are the same as that of the cord connector, but, in addition, has the necessary connection to join it to the motor and treadle of a sewing machine.

Adjustable Bed Lamp

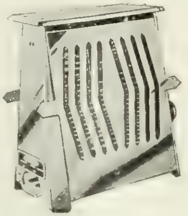
The Faries Manufacturing Co., Decatur, Ill., has placed on the market the bed bracket and lamp here shown. This bracket is designed to fit any bed, either wood or metal, and can be used in any place where there is some means of attaching the device. Its usefulness as a bed lamp is at once apparent, serving to light the room until after one has retired, to see the time during the night, etc. It is made of brass, simple and strong in construction, and the standard finish is brush brass, although it may be secured in any desired finish. By means of a ball joint the bracket can be adjusted to any angle and the light thus directed where needed. The device is attached by means of a brass strap, which fits over the post, rail or rod of the bed, and then tightened by a thumb-screw.



The application of the Bell Telephone Company for a further increase in rates has been refused by the Dominion [illegible] Commissioners.

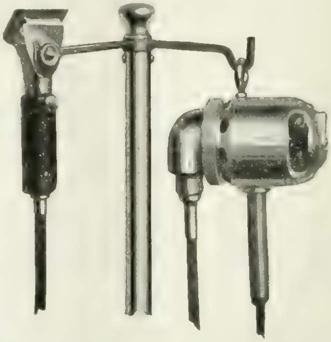
Hotpoint Reversible Toaster

The Canadian Edison Appliance Co., Limited, Stratford, Ontario, are now offering to the trade an improved Hotpoint reversible toaster. The new toaster is simply constructed with a "turn-over" feature that always works, and the element provides an even distribution of heat—thus insuring even toasting. An important feature is that the toast is kept hot while both sides of the bread are being toasted. The design of the toaster is particularly pleasing making the appliance an addition to any dining table.



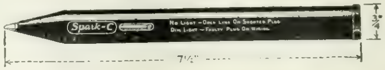
Electric Hair Cutter

The Continental Electric Company, 505-11 King Street E., Toronto have placed on the market the "Royal" electric hair cutter illustrated herewith. This appliance has three moving parts—the eccentric, oscillating arm, and blade. The motor is equipped with a patented speed control, with which the cuts can be regulated from 400 to 1000 per minute. Freedom and facility in handling are obtained by the shaft being swiveled at both the motor and the cutter handle. All gears are located at the motor, resulting in a light weight, smooth-running and vibrationless cutter.



For testing the Ignition

"Spark-C" Ignition Tester, recently introduced at various automobile shows by the Westinghouse Lamp Company, 165 Broadway, New York, is a device for testing the ignition of any internal combustion engine. With its aid it is possible to locate at once any spark plug which is not "firing" properly. It not only tells which cylinder is giving the trouble but what the trouble is. Essentially "Spark-C" is a small Geissler tube filled with a rare gas. This gas has the property of glowing in the presence of an electric current. Its peculiar behavior is put to practical use in "Spark-C". By the intensity of the


Spark-C
No Light — Open Line Or Shorted Plug
Dim Light — Faulty Plug Or Wiring
3/4"
7½"

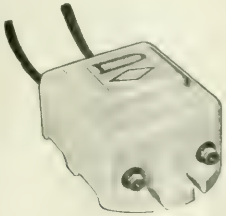
glow in the small tube, one can test with certainty the condition of his ignition system. This device also has many applications in other fields connected with high tension work. In power distribution it is used for a number of purposes. It is invaluable to the owner of automobile, motor boat, aeroplane, tractor or gasoline power plant.

An Electric Tilting Kettle

An electric kettle designed so as to permit water to be poured without lifting it from the stand has been placed on the market by Landers, Frary & Clark, New Britain, Conn. The body is made of heavy spun copper, highly polished, with a nickel or silver-plated finish. The inside is coated with pure tin, silver finished. Other features are its one-piece spout and its ebonized handles, feet and knobs. It is furnished complete with 6 ft. of mercerized cord and a lamp socket plug. The capacity of the kettle is 2½ pt., its height over all, 12 in., and its weight, when packed, 7 lbs. The device consumes 420 watts and is equipped with a patented safety fuse plug.

Ace Bell Transformer

The Dongan Electric Manufacturing Company, Detroit, are placing upon the market the Dongan Ace porcelain clad bell ringing transformer of 8 volts secondary. This type is mounted in white glazed porcelain case, the name appearing in red. The "Ace" contains the same grade construction embodied in the steel clad transformers now being manufactured by this company. The coils are designed to withstand a voltage of 2500 volts between primary and secondary windings, and will not be affected by an indefinite short circuit. The back cover consists of a heavy steel plate rigidly secured to the transformer unit, eliminating any possibility of same becoming loose or allowing the wax to flow out of the case should the bell wires become short circuited, thus causing the transformer to overheat.

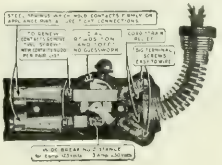


Instantaneous Water Heater

The "Hot Flo" Faucet has recently been put on the market by the Hot Flo Electric Company, 535 Seventh Ave., at 39th St., New York City. A heating element is inserted in the Hot Flo faucet, the handle of which throws the electric current "on" or "off" as it turns on or shuts off the water. The faucet is furnished with a 30-inch No. 14 heater cord encased in waterproof flexible brass tubing, plug, receptacle and plate. It is nickel finished throughout.

Toggle Appliance Plug

The Bryant Electric Company are introducing a new appliance switch plug which will be ready for the market March 1, 1922. It will fit practically all makes of heating appliances and its most important features are a toggle switch mechanism, self-adjusting springs, which make practically tight connection to the pins of the appliance, and very hard, dense composition casings which will stand a lot of abuse. By removing two screws, the contacts can be renewed when they become pitted and worn. This is a very practical feature.



Electric Cigar Lighter

The Cuno Engineering Corporation, Meriden, Conn., has placed on the market the cigar lighter here illustrated. The device is provided with an improved automatic switch which, it is claimed by the manufacturer, makes the lighter practically trouble-proof. It is attached to the battery and is equipped with four feet of automatically rewinding cord. It is so designed that the heating unit, held in place by a bayonet lock, may be removed when necessary.

Electric Railways

A More Detailed Description of the Express and Local Passenger Locomotives for the Chili State Railways

A general description of the electrification of the first zone of the Chilean State Railways has already been given in these pages, when it was announced that the contract for this work was awarded to a Chilean firm, all electrical equipment to be furnished by the Westinghouse Electric International Company. This contract included 39 electric locomotives. A description of the two types of passenger locomotives is given in the following article which, in view of the ever recurring discussion on electrification of certain Canadian steam railways will have a special interest for our readers.

The six Baldwin-Westinghouse electric locomotives which are being built for express passenger service on the Chilean State Railways will be capable of hauling 300 ton trains in either direction between Valparaiso and Santiago without the aid of helper engines as is now necessary on the Tabon grade with steam operation. The locomotive will weigh 127 tons and will have 105 tons on the drivers. It will have a nominal rating of 2250 h.p. corresponding to a speed of 37 miles per hour at a tractive effort of 23,400 lb.

The wheel arrangement will be 2-6-0 + 0-6-2, consisting of two main trucks, each of which has three driving axles and a two-wheel guiding truck. The cab will be of the single box type and the motors will be geared direct to the driving axles. The general dimensions and weights will be as follows:

Classification	2-6-0 + 0-6-2
Length over buffers	57 ft. 4 in.
Length over cab	38 ft. 0 in.
Total wheel base	48 ft. 4 in.
Rigid wheel base	14 ft. 5 in.
Diameter of driving wheel	42 in.
Diameter of guiding wheel	30 in.
Weight of complete locomotive	253,600 lb
Weight of mechanical parts	160,000 lb.
Weight of electrical parts	93,600 lb.
Weight per driving axle	35,000 lb.
Weight per guiding axle	21,800 lb.

The trucks will be connected at the inner ends by a draw bar held in tension by spring buffers. The frames will be cast steel, bar type, located outside of the wheels, connected by cast steel bumpers and cross ties and carried on semi-elliptic springs over the journal driving boxes.

The cab underframe will be of rolled steel longitudinal members connected by cast steel and rolled steel cross members. M. C. B. couplers will be used with Continental spring buffers. Although eventually all drawbar equipment on the Chilean railways will be changed to M. C. B. standard, the Chilean freight cars now use the Continental type drawhooks and for this reason the M. C. B. couplers will be provided with attachments for chain couplers.

The automatic air brake equipment will be the type 14-EL, a standard similar to that used on the present steam locomotives. With this equipment, straight air is available for handling the locomotive alone and the automatic feature for both locomotive and train.

Motors Operate in Series

The express passenger locomotives will be equipped with six 275 h.p. driving motors provided with field control and geared direct to the axles by Nuttall flexible spur gears. These motors are designed for operation two in series on 3000 volts and will be grouped in three speed combinations, all six in series for low speeds, three in series with two groups in parallel for two-thirds speed and three groups each with two motors in series for full speed.

There will be six running positions, the change from one motor combination to another being made by the shunting method of transition.

The control equipment is designed for operation of the locomotive from either end and provision for regenerative electric braking is included. This enables the locomotive to return energy to the overhead system when descending grades. The main motor armatures will be connected in the same combinations when regenerating as when motoring, the excitation for the motor fields during regeneration being supplied by a constant voltage motor-generator set.

There will be two master controllers, one in each end of the cab, and the same controller will be used for both motoring and regulating. This controller will have four levers with a total of 51 notches available in the three combinations. Westinghouse type HLF control establishes the main circuit connections by the use of individual unit switches operated by compressed air controlled by electro-magnetic valves.

Motor-generator sets will supply low voltage current for the control equipment, blowers and compressors. This is a two-bearing type of machine with a common frame for both motor and generator. The normal rating of the set is 35 kw. at 95 volts with 3000 volts at the motor terminals.

The current collectors will be spring raised, air lowered and mechanically locked in the lowered position and controlled throughout by compressed air.

On level tangent track these locomotives will have a running speed of 61.5 miles per hour when hauling a 300-ton trailing load. On the Tabon grade which is 2.25 per cent, the average running speed will be 33.5 miles per hour. The maximum tractive effort based on 25 per cent adhesion will be 52,500 pounds, and the maximum speed 62.6 miles per hour. The range of speed in regenerative braking will be 12½ to 50 miles per hour.

Local Passenger Equipment

In general appearance the eleven Baldwin-Westinghouse electric locomotives for local passenger service will be somewhat similar to the express passenger locomotive. This locomotive will weigh 80 tons and the wheel arrangement will be 0-4-0 + 0-4-0. It will be capable of hauling a trailing load of 350 tons from Puerto to Vina del Mar, 260 tons from Vina del Mar to Llai Llai and return and 300 tons from Las Vegas to Los Andes and return. These locomotives will have a rating of 1500 h.p. corresponding to a tractive effort of 15,600 pounds at a speed of 31 miles per hour. The maximum tractive effort under standing conditions will be 40,000 pounds and the maximum speed will be 56 miles per hour. The cab will be of the single box type and the motors will be geared direct to the axles. The general dimensions and weights will be as follows:

Classification	0-4-0+0-4-0
Length over buffers	40 ft. 9½ in.
Length over cab	31 ft. 0 in.
Total wheel base	28 ft. 0 in.
Rigid wheel base	9 ft. 0 in.
Diameter of driving wheel	42 in.
Weight of complete locomotive	160,000 lb.
Weight of mechanical parts	96,000 lb.
Weight of electrical parts	64,000 lb.
Weight per driving axle	40,000 lb.

The two trucks each having two driving axles will be connected at the inner ends by an articulated coupling in the form of a Mallet hinge. The frame and cab construction, the couplers and the brake equipment will be similar to the express passenger locomotives.

The local passenger locomotives will be equipped with four 275 h.p. driving motors, with field control and geared direct to the axle with Nuttall flexible spur gears. There will be two combinations by connecting the motors in series and in parallel and additional speed variations will be obtained by varying the fields of the motors.

The control equipment is designed for operation of the locomotive from either end but the grade conditions on the section of line where these locomotives will operate do not justify the use of the regenerative braking feature. There will be two master controllers, one in each end of the cab, each controller having two levers, namely speed and reverse, with a total of 23 notches available in the two combinations. The switching equipment duplicates that on the express locomotives.

The motor generator set will be a double armature machine, each armature consisting of a motor and a generator. The normal rating of the set will be 22.5 kw. at 95 volts with 3000 volts at the motor terminals. The current collectors will be the same as on the express passenger locomotives.

On level tangent track these locomotives will have a speed of 56 miles per hour when hauling a 220-ton trailing load. The maximum tractive effort based on 25 per cent adhesion will be 40,000 pounds.

A great many of the electrical and mechanical parts are interchangeable between the express and local passenger locomotives and this will both facilitate the maintenance of locomotives and reduce the maintenance cost.

Major Burpee Becomes a Director of His Company

Maj. F. D. Burpee, manager of the Ottawa Electric Railway Company, has been elected a director of the Ottawa Traction Company, Ltd., of which the Ottawa Electric Railway Company is a subsidiary. Maj. Burpee succeeded Col. J. E. Hutcheson in 1912, when the latter became manager of Montreal Tramways, and has maintained the splendid record of the Ottawa system for both service and efficiency. The life history of Maj. Burpee is a story of constant promotion. His first position with the Ottawa Electric Railway Company was as a stenographer; later he was secretary-treasurer, then acting superintendent, superintendent and, finally, general manager.

If one may point to any special characteristic of Maj. Burpee, it is his faculty of understanding the attitude of mind of the man on the street, and of being understood by him. Quite recently Ottawa has passed through the usual campaign to municipalize the street railway system, and it was largely due to the Major's logical and insistent presentation of the facts, through [illegible] house organ, that the people became convinced that their wisest course lay in leaving matters as they were. Consequently the franchise of the company is being renewed under conditions which appear to be entirely harmonious.

Miscellaneous

Representatives from the municipalities, both urban and rural, along the G. T. R. line between Galt and Elmira, Ont., recently held a meeting in Galt at which a resolution was passed favoring the electrification of the Galt-Elmira line of the Grand Trunk.

At the annual meeting of the Dominion Power & Transmission Company, held recently in Hamilton, the following officers were re-elected. President, Lieut.-Col. J. R. Moodie; Vice-president, Cyrus A. Birge; Treasurer, James Dixon; Managing Director and Secretary, W. C. Hawkins; General Manager, E. P. Coleman; Directors, Sir John Gibson, Lloyd Harris, C. E. Neill, W. E. Phin, Robert Robson and John Dickenson.

Employees of the Dominion Power & Transmission Company were notified recently by the Minister of Labor that he had appointed two Boards of Conciliation to deal with their wage disputes with the company.

Fred Bancroft and F. H. McGuigan of Toronto will inquire into the dispute as it affects the Hamilton street railway, radial lines and engineers; J. C. O'Donoghue of Toronto and Mr. McGuigan will act in the dispute as it affects the Canadian Federation of Electricians.

The employees of the London Street Railway Company, London, Ont., have forwarded to the company a formal notice that they refuse to accept a cut of three cents per hour which the company proposes to make on March 1. The men have requested a conference to discuss the matter.

The Toronto Transportation Commission are having plans prepared for machine shops, to cost in the neighborhood of $1,000,000. It is understood these shops are to be be erected at Davenport Road & Bathurst St., and that tenders will be called during March.

The electrical equipment in the Waterloo factory of John Forsyth Ltd., is being installed by Mr. H. C. Kress, electrical contractor, Kitchener, Ont. In a recent issue we reported, in error, the awarding of this contract to another company.

The Bureau of Standards, Washington, D. C., has just published Scientific Paper No. 427, entitled "Some effects of the distributed capacity between inductance coils and the ground."

The action of the executive of the Hollinger Mines against the Northern Canada Power Company to collect alleged damages to the extent of nearly $2,000,000, has been dismissed by Justice Middleton, with costs.

Messrs. McKeown Bros., 1259 Lansdowne Ave., Toronto, have been awarded the contract for electrical work on residences recently erected at 703 and 705 Windermere Ave., Toronto, for Messrs. Argent & Banks, 29 St. Mark Street.

Current News and Notes

Brandon, Man.

The council of the city of Brandon, Man., proposes opening negotiations with the provincial government with a view to having a power line built west from Brandon, to serve rural districts and points by the way.

Courtright, Ont.

The ratepayers of Courtright, Ont., recently carried a by-law authorizing the expenditure of $11,000 for the installation of Hydro power in that town.

Galt, Ont.

The report for the year 1921 of the municipal hydro-electric department of Galt, Ont., as submitted recently by manager W. H. Fairchild, up to December 31, 1921, shows a revenue for the year of $127,562.01, and an expenditure for operation and maintenance of $110,678.82, leaving a gross profit of $16,983.19. Domestic lighting revenue for 1921 was $44,879.01, an increase of $6,418.67 over last year; for commercial lighting, $19,055.01, an increase of $1,479.94; for power, $47,079.49, a decrease of $2,079.96; and for street lighting $16,548.50, an increase of $195.60.

Halifax, N. S.

Mr. W. W. Hoyt, Hollis St., Halifax, N. S., has secured the contract for electrical work on a Club House recently erected at Point Pleasant, Halifax, N. S., at an approximate cost of $15,000., for the Royal Nova Scotia Yacht Squadron.

Montreal, Que.

The Canadian Comstock, Ltd., 10 Cathcart St., Montreal, has secured the contract for electrical work on the $8,000,000. hotel being erected at Peel & St. Catherine Sts., Montreal, by the Mount Royal Hotel Company, 422 Drummond Bldg.

Mr. J. W. Tousignant, 637 Marie Anne St., Montreal, has been awarded the contract for electrical work on a store building being erected at Marquette & Marie Anne Sts., Montreal, at an estimated cost of $30,000.

Niagara Falls, Ont.

Mr. Arthur Green, Niagara Falls, Ont., has secured the contract for electrical work on a parish hall recently erected at Fourth & McRae Sts., Niagara Falls, at an approximate cost of $12,000.

Ottawa, Ont.

Plans for a dam for hydro-electric power development in the Calumet channel of the Ottawa River at Bryson, Quebec, have been deposited by the Ottawa & Hull Power and Manufacturing Company, with the Minister of Public works at Ottawa and the Land Registry Office at Quebec.

Oxford, N. S.

Mr. Geo. McIntosh, Oxford, N. S., has secured the contract for electrical work on a restaurant building recently erected on Water St., Oxford, N. S., for Mr. H. A. Amos of that place.

Peterborough, Ont.

Messrs. Miller, Powell & Watson, Peterborough, Ont., have been awarded the contract for electrical work on a building at 168 Brock St., Peterborough, that is being altered for apartments.

Pt. Credit, Ont.

Mr. Jas. McMahon, Port Credit, Ont., has been awarded the electrical contract on a residence, garage and swimming pool situated near the Mississauga Golf Course and owned by Mr. J. P. Bickell, Standard Bank Building, Toronto, on which work has recently been started.

St. John, N. B.

Messrs. Mackie & Driscolle, King Square, St. John, N. B., have been awarded the contract for electrical work on an addition to be built to the epidemic hospital on Delhi St., St. John; also the contract for electrical work on deposit vaults to be built for the Eastern Trusts Company, 111 Prince William St., St. John.

Quebec, Que.

Messrs. Jobin & Paquet, 78 Abraham Hill, have secured the electrical contract on a Girls Home, being erected at Darphine & St. Angele Sts., Quebec City, at an estimated cost of $125,000.

Toronto, Ont.

Mr Chas. Wilson, 167 Dovercourt Road, Toronto, has been awarded the contract for electrical work on two residences recently erected at Armadale Ave. & Colbeck Ave., Toronto, by the Godson Home Building Co., 1154 College St., at an approximate cost of $35, 000; also the contract for electrical work on an apartment building to be erected on Glenholme Ave., near St. Clair Ave., Toronto, at an estimated cost of $30,000.

Mr J. H. Harris, 683 St. Clair St. W., Toronto, has secured the contract for electrical work on a Club House recently erected for the Oakwood Lawn Bowling Club, 184 Oakwood Ave., Toronto.

Messrs. Taylor Bros., 25½ Norwood Ave., Toronto, have secured the contract for electrical work on nine residences in course of erection on Gates Avenue, between Westlake & Meagher Aves., Toronto, at an estimated cost of approximately $60,000., by Messrs. Crawford & McClintock, 189 Cedardale Ave.

Mr J. Ritchie, 720 Annette St., Toronto, has been awarded the contract for electrical work on two residences recently ercted on Willard Ave., near Colbeck Ave., Toronto, at a cost of approximately $15,000., for Mr. F. Taylor, 180 Willard Ave.

Mr. F. Johnson, Curzon St., Toronto, has been awarded the contrcat for electrical work on a number of residences to be erected on Stephenson Ave., between Morton Road & Westlake Ave., Toronto, at an estimated cost of $60,000 for Messrs. Grant & Stephens, 4 Moscoe Ave.

An official of the wireless station, recently erected at High River, Alta., held a wireless telephonic conversation with the operator of a radio station at Denver, Col., a distance of approximately a thousand miles.

Paving the Way for More Appliance Sales

J. W. Thomas, electrical contractor of Niagara Falls, Ont., is not suffering from any depression in his business, judging from the following contracts. At the present time he is booked to wire homes for Geo. Dingwall on Wiilmott Street; for Wm. Hodgkins, on Ryerson Avenue; John Lamb, Simcoe Street; Harry Ingham, Willmott Street; Arthur Ingham, Fourth Avenue; Geo. Dingwall, John Street, Highland Avenue, and Fourth Avenue, and a house for John Goring, on Willmott Street. All these residences are being wired for electric ranges, and several of them for electric fire-places.

Electrical News

Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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Recognition of Public Utilities Coming with Trade Revival

Judging by the usual signs, not only are we on the eve of a trade revival but this revival will bring in its wake a more universal recognition of the all-important part that public utilities play in any community's industrial life.

During the period immediately following the war, when the prices of practically every commodity that "retails" into the daily life of our citizens sky-rocketed in price, public services of one kind and another—electric light and power, street railway fares and water rates—were the only things that stood by the citizens in their hour of need, giving the same value for the same price as in former years. It may be quite true that this service was given by force of necessity as many public utilities were operating under hard and fast franchise conditions—but the fact remains the same. As a result, it has been brought home to our citizens that public utilities are essentials and while the average man on the street, pinched from every quarter as he was during the years 1919 and 1920, had not sufficient moral courage, at that time, to admit the injustice of his treatment of these utilities, he is plainly in a different mood today. With the pressure easing up in other directions, he is now able to pay more attention to that still small voice that told him all along he was in the wrong, and he is daily becoming more sympathetic to the needs of the central station, the electric railway and the other utilities that served him so faithfully through the crisis.

This change of heart has also been brought about, in part by the systematic and thoroughly organized campaign of education that has been carried on by many of these utilities in which the customer has been given a more intimate knowledge of the problems of the industry concerned and been led to see that the maintenance of a good service is a business necessity, requiring capital and permanent income just as any other business does. The public always responds to "education" and, in the main, can be trusted to make a correct diagnosis when possessed of the facts.

All this tends to place the public utility in a much more enviable position than it occupied in the recent past. There are other encouraging factors, too. Material costs have receded—and will go lower. Labor has given way a little and must still recede further as wages in other lines, such as construction, for example, gradually sag back. Finally, "Capital" is gradually losing interest in Dominion bonds, which held the stage up to the recent past, on account of the unusually high return; from now on much more money will be available for construction work of every kind for industrials and for properly conducted public utility enterprises.

While it can probably be said that public utilities, as a class, were more adversely affected by the war than any other of our industrial activities, present indications point to a steady revival, with indications of greater permanency owing to the general public's fairer understanding of their problems and of their necessity as a foundation for any substantial commercial prosperity.

The Influence of Home Building on Electrical Activity

The whole electrical industry has much to expect from a revival in the construction industry. This is true more particularly as regards home building. A few years ago the building of a new house costing $10,000 meant a small wiring job of fifty, seventy-five or a hundred dollars at most, with the sale of a few lamps. Today, thanks to "Electric Homes" and similar propaganda, a fair amount of people are awake to the fact that ample wiring is as necessary as ample radiation in their heating systems. Nowadays one finds a goodly number of homeseekers who actually ask about the wiring and, if building their own home, think it only reasonable that the electrical contract should run into four or five per cent. of the total cost of the home. This, therefore, brings the contract on the house mentioned above up to four or five hundred dollars.

And, logically enough, it follows that the properly wired home means electric furniture—floor lamps, table lamps, appliances of every kind These run into considerable expenditure—perhaps a couple of hundred dollars on the average—bringing the total revenue to the contractor-dealer to six hundred or seven hundred dollars.

There were 16,300 homes built in Canada last year. There were 110,000 marriages. Is it any wonder, with this disproportion, that rents continue their upward trend and that the clamor for more homes is more insistent than ever? It is highly probable that 30,000 homes will be built during 1922. This means 30,000 times (say) $350, for the industry in wiring appliances and labor—ten and a half million dollars in new houses alone.

So we see how intimately the electrical industry is tied in with house building. There is also, of course, the office and factory of every kind, but the demand is not so insistent in this direction. If the contractor-dealer will work closely with the architect during the present summer the end of 1922 will tell a very different tale, not only for them, but for our manufacturers, central stations, and wholesalers as well.

And, added to that, don't let us forget the wiring of "old homes."

The Booster Rotary Converter

With Special Reference to the Installation at the British America Nickel Corporation's Refinery

By RUPERT F. HOWARD*

The synchronous booster rotary converter is not a piece of apparatus new to the electrical business, as it has been in use for several years. However, it is a type of apparatus not generally known. Indeed, very few, perhaps aside from those whose work brings them in contact with it are familiar with this form or rotary converter. The number of installations of these machines in Canada can be counted on the fingers of one hand.

The first rotary converters were used where a constant voltage supply was required, and since the ratio of the alternating and direct voltage is practically constant, the rotary converter is inherently incapable of voltage regulation except within very narrow limits. They were used extensively on 25 cycle circuits feeding Edison 3-wire systems, and to a limited extent in some industrial applications. In fields other than these the booster rotary converter has until recently been practically unknown.

Ten years ago the 60 cycle rotary was often shunned when it came to the choice of a good reliable operating unit. On 60 cycle systems in particular where companies have Edison 3-wire networks, the converting agent was the motor generator. With the improved 60 cycle rotary, reliability of operation is assured, and we are becoming more and more inclined toward this machine.

From the improved 60 cycle rotary it is but a step to the booster type.

A booster rotary converter is a combination of a specially designed shunt wound converter, and an alternating current generator or booster, having the same number of poles in its field as in that of the converter.

The most satisfactory type of booster rotary so far developed has revolving armatures and stationary fields for both the converter and booster. The booster armature is mounted on the shaft between the collector rings and the converter armature, and the booster and converter frames are mounted side by side on a common bedplate. In this construction the windings on the booster armature are connected to the collector or rings on the one side, and to the converter armature taps on the other.

The purpose of the booster is to make it possible to obtain a variable continuous voltage from the converter. They are made shunt wound with commutating poles, the purpose of these additional poles and windings is to provide the proper commutating field at all loads with fixed brush position. The addition of commutating poles is one of the most important developments in these rotarys, and has been responsible for the manufacturers redesigning complete lines of machines,—speeds were increased, weights and floor space reduced, efficiencies increased, and commutation placed on a totally different plane.

Fig. 1—Complete machines as installed and shows the relative positions of the booster and the main rotary.

Fig. 2—Shows a cross section of a standard booster rotary converter.

Probably the most useful fact to remember in connection with rotary converter operation is that the ratio between the a.c. and d.c. voltage is fixed once for all by the design proportions of the converter.

When varying direct current voltage is obtained, as by compounding the converter, or by the addition of the booster, it is obtained only by changing the alternating current voltage delivered to the converter armature winding. This characteristic of the rotary converter, more than any other, differentiates it from the direct current generator, and causes many of the differences in behaviour between these two classes of machines under the various conditions that arise in operation.

Fig. 3—Shows the development of booster and converter armature windings.

With this arrangement any generated voltage in the armature of the alternator, or booster, will add to, or subtract from, the impressed voltage at the rings or a.c. end, depending upon the direction of this generated voltage, which in

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*Chief Engineer for the Corporation.

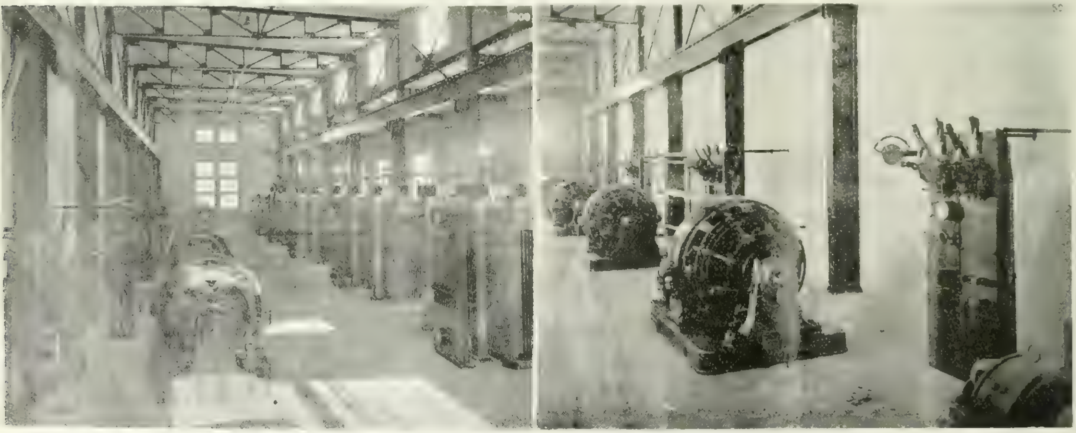


Fig. 1—Left, Rotary Substation. View looking towards local switchboard Right, Rotary and d.c. Panel—British America Nickel Corporation

turn depends upon the direction in which its field is excited.

When the d.c. voltage of a booster rotary is to be raised, the field strength of the alternator, or booster, is increased in the proper direction, and its armature voltage adds to the impressed voltage at the rings, with a resulting increase in the d.c. volts. Conversely, if the d.c. voltage is to be lowered, the field of the booster is reversed so that its armature volts oppose the impressed voltage at the rings, resulting in a lower d.c. voltage.

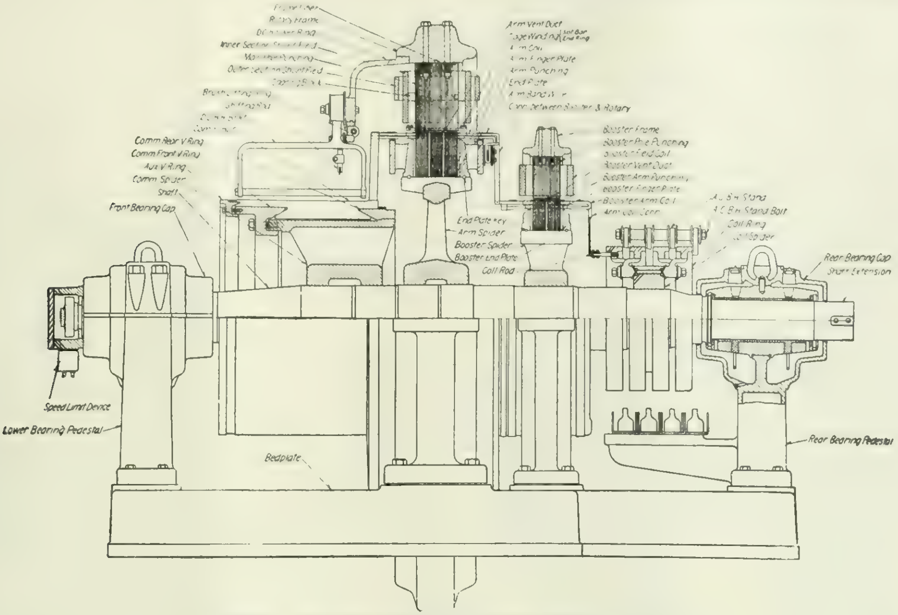


Fig. 2—Cross Section of a Standard Booster Rotary Converter

When the converter is operating at normal voltage with the booster idle, its action is no different from that of a straight rotary converter. When the booster is operating to raise the voltage, its action is positive, and it operates as a generator being driven by the converter, which acts as a synchronous motor. When the booster is operating to lower the voltage, its action is negative, and it operates as a synchronous motor driving the converter, which acts as a direct current generator.

The outstanding advantage of the booster rotary over the straight rotary, is that it has a d.c. voltage range of approximately 12% above, and 12% below any neutral voltage. This feature makes it a desirable machine for lighting and railway work, as well as its application to electrolytic operations.

The straight rotary has an automatic compounding effect of about 5%, but where special design features are used in the transformers and supply circuits to the rotary, something higher than this can be obtained.

The booster rotary with transformers, from the standpoint of economy, is superior to the motor generator.

In the smaller capacities their first cost is in excess, and in the larger capacities is less than that of the motor generator. The greater economy usually makes the matter of first cost of small importance.

Consequently, the rotary converters can be recommended in preference to motor generators, except:—

(1) Where they are to be used on a system having poor regulation where d.c. service may require close independent regulation.

(2) Where large corrective effect for low power factor is desired.

(3) Where regulation of frequency and voltage is so poor as to prohibit the use of synchronous apparatus, in which case the induction motor generator is used.

The British American Nickel Corporation, near Ottawa, uses a large block of power for electrolytic refining of nickel and copper. Direct current being used exclusively in the deposition tanks.

The choice of generating equipment for this plant lay between motor generators and booster rotary converters.

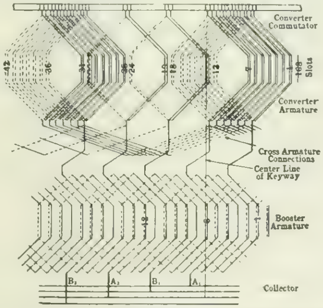


Fig. 3—Development of Booster and Converter Armature Windings and Connections

The load factor of a plant of this kind, if properly operated, is in the vicinity of 95%. The greater economy of the rotary operating under the above conditions, coupled with the lower first cost, made it the logical choice over the motor generator. This electrolytic load with rotary converters and consequent high power factor, makes it a very desirable one from the central station standpoint.

In the normal operation of a re[illegible] a kind, it is necessary for the electrical equipment to have as great a degree of flexibility as is found in any commercial electrometallurgical process. It is necessary at times to raise or lower the d.c. volts about 10% so the booster rotary is as well suited for doing this as a motor generator is.

In this particular installation it is necessary to have a d.c. voltage range of from 50 to 290 volts to permit satisfactory starting and operation in the event of it being desired to operate at reduced capacity with reduced number of tanks. These rotaries must give full load current at all voltages between the above limits.

A range of voltage, such as the above, has never been used (to the writer's knowledge) in this country for electrolytic refining on a large scale.

A wide range of voltage can be obtained with a straight generator using less switching equipment than is necessary with these rotaries, but it is interesting to know that this can and has been accomplished with the booster rotary converter in a most satisfactory way.

Fig. 4—Shows the diagram of connections of the switching arrangement.

The rotaries are made self-starting in the same way as any other rotary or synchronous motor.

The wide range of d.c. voltage is obtained by using several tanks on the low tension side of the transformers, and the operation of getting this voltage over the range is carried out as follows:—

The switching is arranged so that one switch handle operates all the necessary switches for changing from one tap to another. The operation consists only in opening one handle and closing another. The switches are interlocked so there is no possibility of getting two sets of switches closed at one time.

Manually operated switches are used throughout as they are of such capacity and weight that they can be easily operated this way.

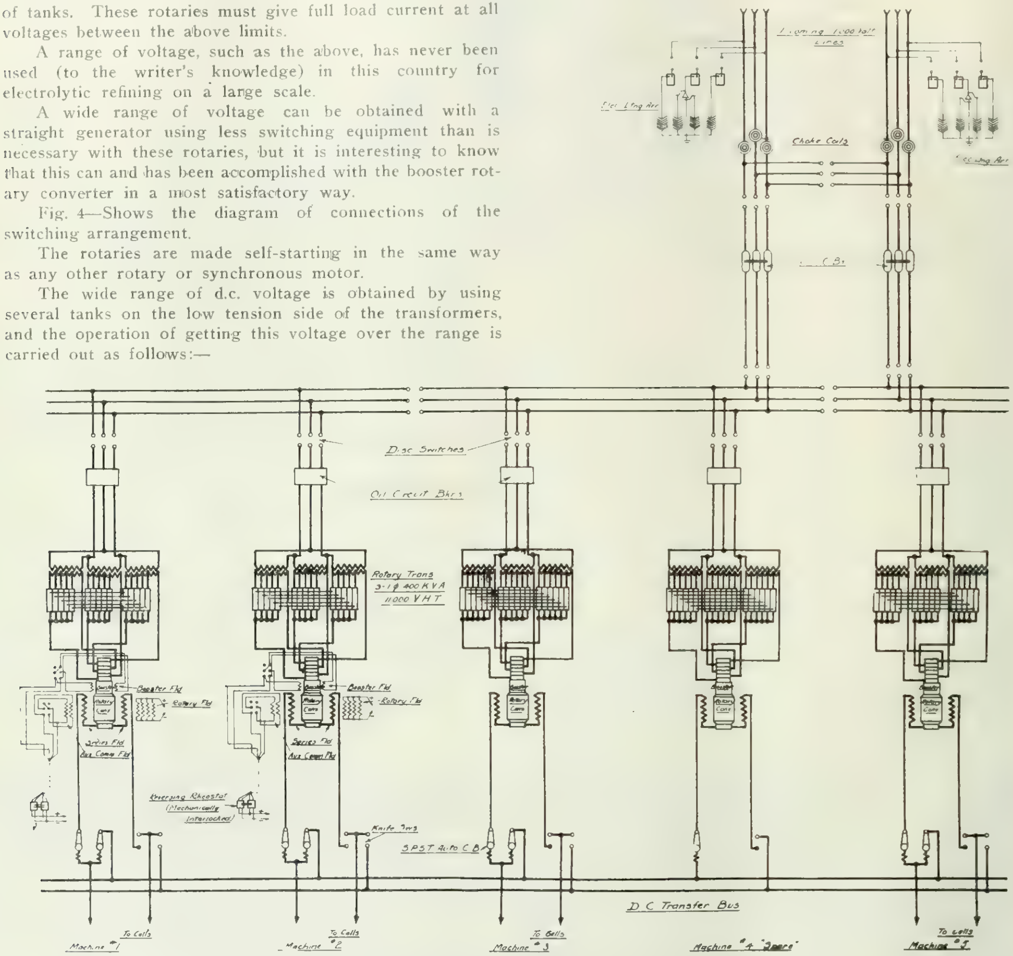


Fig. 4—Showing Diagram of Connections of Switching Arrangement

With the rotary up to speed and on the line, the lowest tap voltage is impressed. This gives the lowest neutral d.c. voltage, which can be lowered or raised 12 per cent by varying the field of the booster, as described above.

By applying the next higher tap voltage, the next highest neutral d.c. voltage is obtained, and this can be lowered, or raised, 12%, and so on till the highest tap has been reached. The high point on any tap just overlaps the low point on the next higher tap, eliminating all gaps over the complete range, and a smooth voltage curve results between 50—290 volts.

The oil switches controlling the various transformer taps are all mounted in the basement below and directly under the starting panel.

Once the machine is up to speed and voltage, all d.c. switching, field and voltage adjustments are done on the d.c. board, shown in Fig. 5.

There is no particular reason for having the a.c. and d.c. panels together, in fact it was desirable to have them separated for installation purposes. The conductors having such a large cross section required lots of room.

From an operating standpoint there is no drawback in separating the a.c. and d.c. panels. There is always ample time to do the d.c. switching and make voltage adjustments after the rotary has been put on the line.

All the necessary indicating instruments are mounted on the d.c. panel.

The machines are completely separated and each is connected to its own tank circuit during normal operation. A rotary with its bank of transformers and its tank circuit, comprise a complete unit. The switching arrangements, however, are such that any machine can be operated on any tank circuit. (Refer to Fig. 4)

A spare machine is normally ready for use on any circuit when any of the other rotaries are down for repairs or cleaning.

Power comes into the substation over two circuits, at 11,000 volts, three phase, 60 cycles.

The electrolytic equipment as worked out by the writer in conjunction with the Canadian Westinghouse Company consists of five duplicate units, three for nickel and one for copper. In usual operation the fifth unit is normally a spare, each composed essentially of—

One synchronous booster rotary converter having a maximum continuous capacity of 1,160 kw. 4,000 amps., 290 volts, and a normal operating range of 230 to 290 volts, supplied by three 400 kv.a., 11,000 volt, 60 cycle transformers, having 8-turn secondaries tapped out to the switches in such manner as to permit any of the six voltages being impressed on the rotary, all as described above, and thus give it a total continuous range in voltage of from 50 to 290 volts.

The efficiencies of these units and of motor generators of the same capacity are approximately as follows:

Booster Rotary Converters

½ Load	¾ Load	Full Load
92.5	94.1	95.5

Motor Generator Set

½ Load	¾ Load	Full Load
84.4	87.6	89.0

Equipment such as this in electrolytic refining plants for nickel is interesting when we consider that over 80% of the world's supply of nickel comes from Canada and is mined in the Sudbury district.

B. C. Electric Asks for Dominion Control

A somewhat complicated situation presents itself in the areas of the lower mainland of British Columbia served by the British Columbia Electric Railway Company, which supplies light, power and street car interurban services to all the communities centred in the lower Fraser valley. The cities of Vancouver, North Vancouver and New Westminster, the suburban municipalities of North and West Vancouver, Point Grey, South Vancouver and Burnaby, and all the rural municipalities outlying from New Westminster are affected by the application made by the company to be brought under the jurisdiction of the Dominion Board of Railway Commissioners. Most of the communities interested, through their councils, have put up an opposition to the application and it is a matter of conjecture yet whether the Board will accede to the company's request.

The application has been made following the withdrawal of an agreement for renewal of the company's charter offered to the municipalities last year. Franchises in the several cities and suburban municipalities have been matters of separate negotiations in the past. Varying terms of time have been arranged and conditions under which the franchises were secured have also varied. The situation at the moment is that some agreements have outrun their time and have not been renewed. Other agreements, for instance with the city of Vancouver, automatically carry on, under the terms of the franchise pending a new agreement. The Public Utilities Commision, a provincial body under whose jurisdiction the B. C. Electric functioned for a period, was dissolved some two years ago, and in the interval no new authority has been arranged which could deal with the affairs of the company.

Owing to the fact that its services extend over so many different municipal territories the company finds it difficult to finance needed expansions, such as new car lines in the cities it serves. Its claim is that some stability must be given to the conditions under which it operates as an assurance to investors that its stocks are a sound and reliable investment. The absence of a provincial authority, the failure to negotiate a renewed agreement for a period of years, and opposition to that agreement by the municipalities are given as reasons for the present application to be brought under the Dominion Railway Board.

Electric Ovens and Furnaces

The Toronto Section of the American Institute of Electrical Engineers held a joint meeting on Febuary 28 with the Ontario Section A.S.M.E. Mr. J. L. McK. Yardley spoke on the subject "Industrial Electric Oven and Furnace Construction and Application."

The speaker dealt first with the resistor materials used in heating elements, which may be briefly summarized as follows:—

Nichrome: (Ni. Cr. Fe. Mn.)	up to 800° F.
Chromel: (Ni. Cr.)	up to 2000° F.
Nickel-Iron alloys	up to 1100° F.
Copper-Nickel alloys	up to 1100° F.
Carborundum	up to 4000° F.
Graphite	up to 5500° F.

Though the line of demarcation between ovens and furnaces as regards temperatnres is not a definite one, it may be said that it lies roughly in the neighourhood of 1000° F. Temperatures up to 2500° F. may be measured by thermocouples; and above that optical pyrometers are usually employed.

The address was profusely illustrated by slides showing the details of construction and application of ovens and furnaces of the ordinary resistor types and of such special types as the "molten salt" furnace and the modern high frequency induction furnaces. In conclusion the speaker referred to the great future which was undoubtedly in store for the electric furnace in the glass, textile, mining, ore treating, paper making and lime industries.

The Public Utilities Commission of Collingwood, Ont., announce the official opening of their new Hydro Shop, offices and warerooms on Thursday and Friday, March 9-10. Demonstrations were given by experts on electrical ranges, washing machines, automatic pumps and other appliances. E. J. Stapleton is superintendent of the Collingwood Utilities.

Col. R. W. Leonard was recently presented with the Leonard Medal for the best paper presented during the past year before the Engineering Institute of Canada or the Canadian Institute of Mining and Metallurgy. The medal is in the shape of an irregular moulding, resembling a nugget, smoothed out.

First 50,000 h.p. Unit of Chippawa-Queenston Power Scheme—III.

The Story of the Methods of Construction One of the Most Interesting Features of This Big Development. Removing Seventeen Million Cubic Yards of Material and Cutting Through Rock and Earth One Hundred and Forty-five Feet Deep.

From the intake at Chippawa to the power house at Queenston, as already explained, the canal measures 12¾ miles in length, of which the first 4¼ miles follow the route of the Welland River, formerly a sluggish stream with a flat gradient, whose flow has been reversed. The remaining 8½ miles of canal is dry excavation in earth and rock and is the part of the work that has involved construction operation carried out on a scale and with a speed hitherto unprecedented. From Montrose, on the Welland River, where the canal proper begins, the first mile was dredged through earth and is similar in section to the Welland River cut; from this point the canal, which runs in a general northerly and easterly direction, is all in rock with the exception of the built-up, rock-filled section, 2,500 feet long, adjacent to the Niagara Whirlpool. The lower end of the canal opens up into a triangle-shaped forebay cut into the rock at the top of the cliff near Queenston. Where the canal is in rock, the sides and bottom are lined with concrete for the purpose of increasing its carrying capacity by virtue of the smooth surface thus obtained. It was estimated that the capacity of the canal would be increased 20 per cent. by means of the lining, but in view of the exceptionally fine quality of work as actually constructed, it is now evident that an even greater increase in flow will be obtained.

Among the special features of the canal may be mentioned the massive electrically-operated control gate located near Montrose, for controlling the flow in the canal; the deep excavation at Lundy's Lane crossing, where the bottom of the canal is 143 ft. below the level of the ground; the various railroad and highway crossings over the canal; and the "Whirlpool section." The last named is that part of the canal which crosses over an old gorge, the bottom of which was largely composed of quicksand. The construction of the canal across the valley was accomplished by first filling the whole gorge with rock excavated from other parts of the canal, and then allowing this rock-fill to come to a final settlement. After this it was excavated for the canal section and faced with a heavy reinforced concrete lining.

Unusually Large Construction Machinery

The Hydro Electric Power Commission's engineers when investigating the economics of the development, made very exhaustive investigations into the construction methods that would have to be adopted, inasmuch as the type of construction plant and the manner of its operation would have very considerable bearing on the cost of the project. From the start it was obvious that something entirely unusual in the way of plant and methods would have to be adopted to handle a construction project of such unprecedented magnitude. In the determination of the exact type of plant to be employed in the construction work certain conditions expressed themselves. These were: (1) The availability of cheap electric power for operating construction plant, (2) large quantities of earth and rock to be removed—about 17,000,000 yds.—which made it possible to consider excavating equipment of the heaviest type and largest capacity obtainable, and, (3) excellent facilities for the disposal of the spoil along the Niagara escarpment, within short hauling distance of the site of the work. With these conditions in mind, a very thorough study of various kinds of construction equipment was made by the Hydro engineers and a large amount of information was obtained concerning the output, operating costs, working conditions, etc., of all types of electric and steam operated excavating equipment.

Largest Shovels in the World

The result of these investigations was that new construction appliances, such as large shovels and special concrete forms, were created to carry on operations of the stupendous magnitude involved in this project. The excavation was carried out with the aid of fourteen shovels, most of which were electrically operated, and five of which were larger than any heretofore built. The largest shovel handled an eight cubic yard bucket for earth and one of six cubic yards capacity for rock. They weigh over 400 tons each, are operated by motors aggregating 750 horsepower for each machine and have a capacity of 150,000 cubic yards of earth or 70,000 cubic yards of rock per month per shovel. These shovels could load cars standing 73 feet above their location. They were also very speedy and were capable of loading a car of 20 cubic yards capacity, standing 60 feet above the shovel in 1½ minutes. The booms of these shovels were about 90 feet long and the dipper sticks 58 feet. Sixteen wheels, eight on each side, comprised the mounting, the machines running on two tracks (four rails) spaced 30 feet apart on centre. Two of the large shovels were steam operated instead of electrically driven only because the manufacturers were able to place better delivery on steam equipment. Other shovels with capacities of 7/8 to 4½ cubic yards were also used, some of these having caterpillar traction and the majority being electrically driven.

Other equipment for excavation operations included 17 channelers, numerous rock drills, dredges and a cableway excavator, the latter being used for widening and deepening the Welland River section of the canal.

Electric Construction Railway

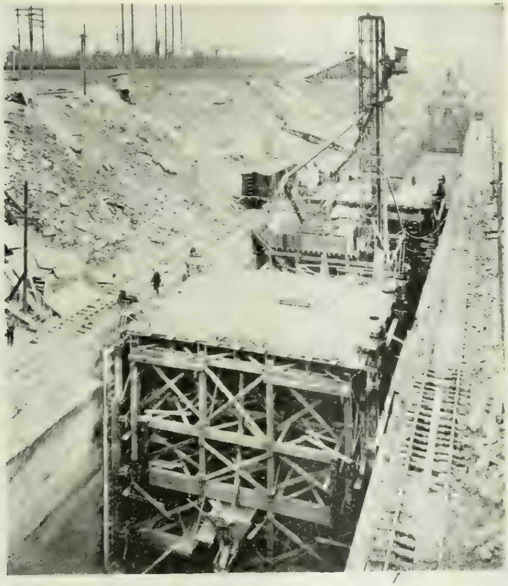
In order to efficiently carry away the enormous amount of excavated material, a standard gauge, double track electric railway in which standard 80 pound main line rails have been used, was constructed along the entire route of the canal, with branches to the disposal areas. Eighty-two miles of track were laid altogether. The rolling stock consisted of 50 locomotives, 24 of which were electric, and over 300 air-dump cars of 20 cubic yards capacity each. The trolley wires on this railroad were offset on one side of the track to allow the dippers of the shovels to pass over the cars freely when loading them and to permit locomotive cranes to use the tracks. On temporary tracks, alongside the dump, for example, the trolley wires were carried on framed timber trestles which were mounted on wheels to facilitate removal when necessary to shift the track.

For the operation of the electric railway, electric shovels and other machinery and equipment over 13,000 electrical horsepower were required.

In addition to the equipment above noted, other special machinery and devices were developed, which will be described in detail as this article proceeds.

Excavation Methods

On the Welland River section of the canal, the excavation was carried out largely by a cableway excavator and by dredge. The former equipment was a Lidgerwood cableway of 800 ft. span on an 80 ft. head tower and 60 ft. tail tower, fitted with a 3 cu. yd. clam. The towers were mounted on railroad trucks running on parallel double tracks. The capacity of the plant was such that a trip of the bucket was possible every two minutes. For the first 4,400 ft. of the river a dipper dredge was used, as bridges and other impediments interfered with the operation of a cableway. In the latter part of 1920, when it was decided to make strenuous efforts to complete the canal by the end of 1921, the suction dredge "Cyclone," the largest in the world, was transferred from the harbor development at Toronto to the Welland river, where it assisted in the excavation of both the river section and the earth section of the excavated canal. On account of the tremendous size of the dredge, considerable trouble was experienced in transferring it from Toronto to the Chipawa canal, particularly in navigating the Welland river, where bridges, power lines and shallow water offered impediments, which were successfully overcome, however, as described in the Contract Record of May 11, 1920, page 458. The work of the dredge has amply justified its use on the Chippawa work, as in 5½ months it removed 1,160,000 cubic yards of earth, an average of over 200,000 yards a month.



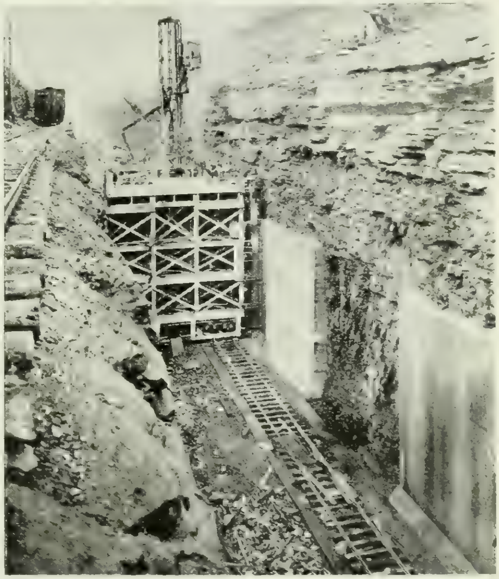
The plant for lining the side walls of the canal. Two form carriers and a mixer unit comprise the equipment.

On the artificial section of the canal, excavation included removal of rather heavy overburden and deep rock cuts. The overburden was partly fine wet clay sand and partly very stable red clay all of which was removed by the revolving shovels mentioned previously.

On the rock cuts, the first ten feet of the sides was channelled, but below that the rock was close drilled. The spoil was removed by the shovels referred to. The method adopted was to operate on a series of benches or cuts resembling stair steps, with one shovel following the other until the proper grade was obtained. The spoil was loaded directly by the shovels into the dump cars on the track situated anywhere from 45 to 75 feet above shovel grade.

17,000,000 Cubic Yards of Excavation

The amount of material excavated from the canal proper was over 17,000,000 cubic yards of earth and rock, the earth excavation amounting to 13,200,000 cubic yards and the rock to 4,182,000 cubic yards. The deepest cuts were 72 feet in earth and 85 feet in rock. At one point—Lundy's Lane crossing—the combined earth and rock cut was as much as 145 feet deep. From these figures it is evident what a tremendous undertaking this excavation was. The speed with which it was carried out was remarkable as the entire work of constructing the canal was accomplished since March, 1918, when active excavation with the large shovels began. Of course, a huge construction force was employed, at one time there being 8,100 men on the payroll, although the average force was much smaller than this.



Placing concrete lining on rock sides of canal. Completed sections, 40 feet in length, in foreground.

This wonderful achievement was largely due to the type of excavating equipment adopted. The economy of the large shovels is illustrated by the fact that in 1917 when some preliminary work was commenced with railroad type shovels, direct labour cost comprised 29 per cent of the total unit cost of excavation, while in 1920, when labour was at its peak, costing 250 per cent more than in 1917, the labour cost per yard of excavation has only increased 4 per cent over the 1917 figure of 29 per cent. This would indicate that the saving of man power resulting from the use of the large excavating units practically offset the 250 percent increase in labour expenditure.

The rapidity of operations possible with the plant at the disposal of the construction organization is best realized by the fact that in the past year 3,710,000 cubic yards of earth and 2,410,000 cubic yards of rock were removed. Twelve months ago only 7,000 feet of the rock cut was completed to a maximum depth of 60 feet. Since that time, the whole canal has been completed, quite aside from work on the screen house and power house—surely a stupendous and wonderful achievement.

In excavating the canal, the general method was to start a pilot near one side of the canal prism with a railroad shovel loading cars on the ground surface. In this cut were run the loading tracks for the big shovels which followed a pilot cut on the rock surface. The loading tracks connected with the main line at both ends. The shovels worked through in steps, as already explained, loading the spoil into dump cars, which were operated in 8 and 10 car trains. As many as 300 trains a day were often necessary to dispose of the excavation.

The rock was drilled, except for the first 10 feet, which was channelled. Rock drills of standard type were employed as well as submarine drills mounted on high frames similar in design to a pile driven rig. Each drill on equipment of this sort was carried in the 55 foot leads of the frame from the main line of a hoist mounted on a platform behind the leads, a spare line on the drum being used to elevate the drill steels when required. The frames were loaded on skids or rollers to facilitate shifting within the canal prism. The drills were of a maximum diameter of 4½ inches and minimum diameter of 2 inches.

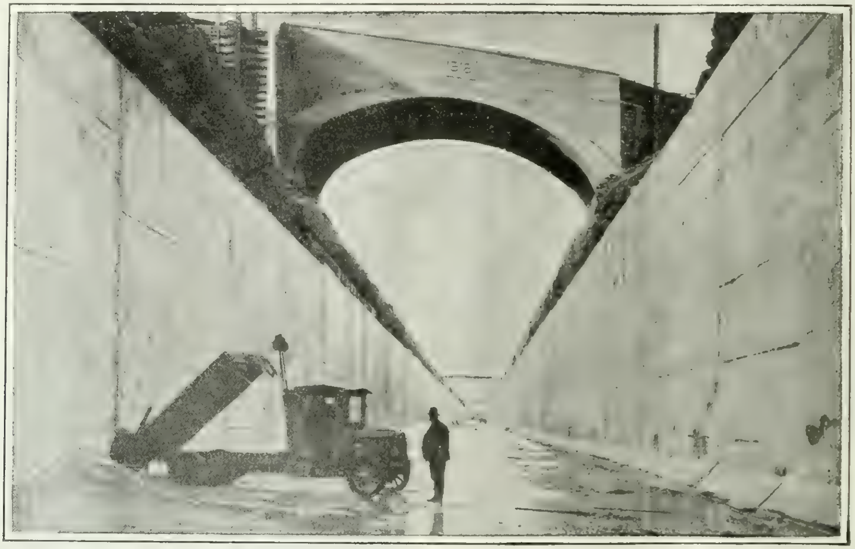
The forebay excavation was begun by shooting out a 10 foot lift over the entire area, about 1,100 holes being fired at once. About one pound of dynamite to the yard, including that used for springing the holes, was used. Each hole was sprung with 5 or 6 sticks and loaded with 15 or 20 sticks, the spacing being 7 feet each way. As a result of this initial blast about 60,000 cubic yards was broken up fine enough to be handled by the railroad shovels.

Bridges Built Before Excavation

About 17 bridges were required to carry highways and railways across the line of the canal. On some of these early construction was essential to the prosecution of the excavation and for that reason were constructed before any of the digging was carried out in their vicinity. This gave rise to the remarkable phenomenon of bridge structures erected below the ground surface, the shovels later removing the earth from around and beneath them. When bridges were built in this way, an enclosure of steel sheet piling was used as a cofferdam. This manner of constructing bridges made concreting operations very easy inasmuch as a mixer was placed on the edge of the excavation to spout the concrete directly into the forms.

Disposal of Spoil

Practically all of the excavation had to be wasted Some of the rock was used for concrete purposes and some for riprap, and at the whirlpool gulley about 1,500,000 yards of rock obtained nearby was dumped and allowed to consolidate but practically all the rest was conveyed to a 200 acre dump capable of holding 21,000,000 cubic yards. Some smaller dumps were used, but the one mentioned which was two miles from the canal received the greater part of the spoil.



View of canal showing a typical railway crossing

This fill was reached by a double track spur of the construction railway. The trolley wires along this dump were carried, as explained before, on portable frames. These frames with outriggers for the trolley supports were mounted on flanged wheels which run on short sections of track set up on the filled side of the tracks on which the dump trains ran. As the fill progressed and the filling tracks needed to be shifted, the trolley towers were moved accordingly. When first dumping the fill, a trestle was built well out into the middle of the dump area and the fill started from it. In addition, the tracks fanned out over the side from the corner where they entered the dump. In this way suffcient places of dumping were maintained to take care of the spoil without any train interference.

Crusher Plant

The crusher plant was located near the forebay and received material by rail in the 20 yard dump cars, which discharged direct into a large hopper lined with 2½ x 6 inch steel bars laid flat. The crusher fed from this hopper was a 60 x 84 inch jaw outfit operated by a 250 h.p. motor, reducing the stone to 8 inch size and delivering it to a belt which took it to the top of the secondary crusher house. In this were three gyratory crushers reducing the stone to 2 inch size. From these crushers the material passed through a screen which removed dust and oversize stone and then was carried on a suspended belt conveyor over the storage pile. At the end of the storage pile was the bin structure for the receipt of 1 inch stone used for reinforced concrete. The 1 inch stone was obtained by passing the oversize into small auxiliary gyratory crusher which delivered its product directly to the bin mentioned above.

The sand was brought in by car and dumped into a track hopper from which it was carried on a 14 inch conveyor to a bucket loader which lifted the sand to an overhead conveyor running over the storage pile which was adjacent to the stone pile. Reclaiming conveyors beneath the piles carried the aggregates to the concrete mixing plant at the top of the escarpment, from which plant the screen house and part of the power house were concreted.

Scaling of Rock

All of the rock, except in the forebay, was scaled before the concrete lining was applied, in order to remove uneven projections. This work was done with movable towers which practically occupied the entire canal prism. These scaling towers were simple wooden frames mounted on trucks for movement on sectionalized track. At each side was a platform suspended by wire cables from sheaves on top of the frame and counterweighted for easy movement. From these platforms the scalers removed all pieces of rock projecting over the line of the clean cut which was indicated by a plumb line hung from the top of the trestle. The scaling was done with picks and hand air tools, the air being supplied from the pipe lines parallelling the canal.

At the same time as the scaling was carried out, dowels of old steel rods were grouted into the sides of the cut at 4 ft. intervals in both directions, in order to bind the concrete lining to the rockface. These rods were about ¾ inch in diameter, 2 ft. 9 in. long, embedded 2 ft. in the rock and bent up vertically so as to hold the concrete lining.

Lining of the Canal

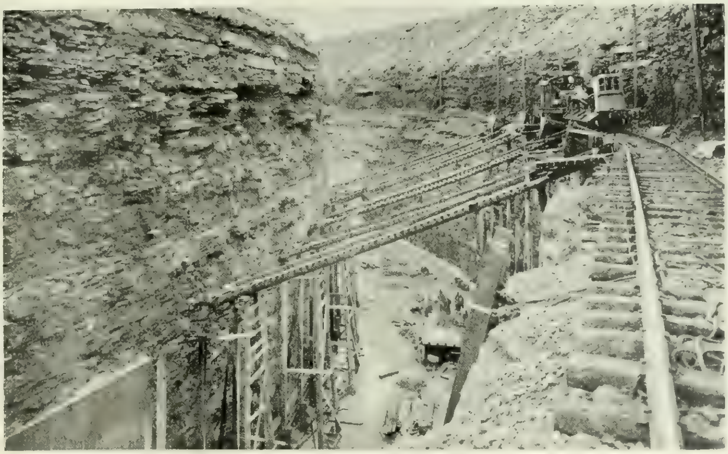
After the rock sections of the canal were excavated and scaled, they were lined with concrete to reduce water friction. This lining was from 30 to 34 ft. high. The floor was at first paved with at least 6 in. of concrete laid in three longitudinal slabs—two slabs each 13 ft. wide, spaced 18 ft. apart, this 18 ft. space being later filled in. The typical plant for carrying out this work consisted of a 1-yd. paving mixer with chute, mounted on a flat car, which also carried an overhead bin to hold sand and stone, and a cement platform. A chute, fastened to the frame and extending to the construction railway on top of the cut, permitted sand, stone and cement to be passed to the mixing unit.

When the floor was laid, the sides were poured, special equipment being used to do the work. Nine of these plants were in use, each one consisting of one concreting unit and two form carrying units, the three comprising a "battery." Each section of the battery was mounted on trucks running on two parallel tracks (4 rails) and while each was capable of independent movement, the three were operated in conjunction as a self contained outfit, forming and lining the two sides of the canal at the same time.

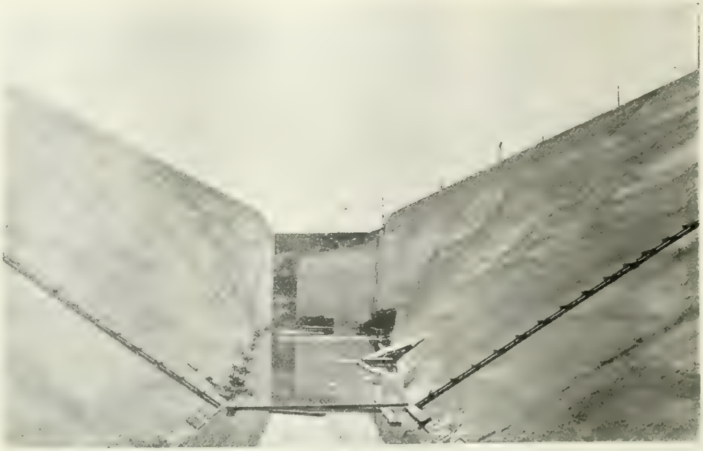
The centre of the three sections of the battery formed the mixer unit and comprised hoppers for the storage of sand and stone, a large capacity steam mixer and a hoist tower with spouts for chuting the concrete to place in the forms. The other two sections were form carrying units, each consisting of a timber frame filling the canal prism and carrying the wall forms which were steel plates on a steel framework. Jacks were inserted between the frame and the forms, so that the form could be adjusted in proper alignment and so that it could be swung back after the concrete had set sufficiently to allow the unit to be shifted to the next position.

The walls were poured at least 6 in. thick in alternate 40 ft. sections, one form unit being used for the first pourings and the other for the intermediate pourings. The forward form unit was provided with side bulkheads to retain the concrete but the second unit, of course, did not require these and the wall slabs already poured acted as retainers. A fillet was formed at the junction of the wall and the floor, this being poured with the wall. For easy chuting and for spading, etc., the wall forms were built in removable sections. As soon as the concrete had set, finishers patched up any unevenness.

On the Whirlpool section, a different procedure was adopted. This portion of the canal was trapezoidal with side



One of the curves in the Chippawa canal. At this point the rock cut is 85 ft. and total cut 143 ft. in depth



A transition portion of the canal where the rectangular section merges into the trapezoidal section. Note the excellence of the concrete lining

slopes of 1 on 1½ and the lining was laid on the slope and heavily reinforced. Three-foot strips of concrete were first laid by ordinary methods up the slope at 18 ft. centers. The intervening spaces were then filled in. At the beginning wooden forms were used, these being in panels 3 ft. wide by 16 ft. long, attached to the concrete strips by anchor bolts. To get away from the carpenter work entailed by these forms, a steel screed or sliding form was later devised. This measured 16 ft. long by 17 ft. wide, and consisted of one thickness of ¼-in. steel plate with a 9 in. channel around the outside and reinforced with 9 in. channels placed horizontally across the plate at 9 in. centers. The drawbar was a continuation of side channels, brought together about 6 feet ahead of the form. A hand winch was placed at the top of the slope by which the form was moved upward.

The bottom 20 ft. of each panel was poured behind the regular forms and allowed to set. The steel form was then placed on this and kept moving slowly up the slope, the concrete placed being kept almost even with the top. By the time the plate had passed over the concrete it was set sufficiently to stay in place. The result of the use of the steel form was a much more uniform face and a better chance to finish, as finishers could get to work sooner and could work on green concrete. Only one finisher was allotted to each panel, he following the form as it went up the slope.

Some of the finest concrete on the canal is at the transition sections, where the canal changes from earth to rock and from rock to Whirlpool sections. At these points, the lining was applied in smooth curves to reduce friction to a minimum and special care was taken in pouring to avoid any irregularities.

In the forebay a smooth lining was not deemed essential, as the velocity of the water is very low. However, the rock wall was sealed by a coating of gunite to a depth of a few inches.

Power House Construction

The power house, located at the foot of the cliff, near Queenston, involved very interesting construction methods. Inasmuch as the whole of the building is not required at present, the superstructure as constructed today is only one-fourth of the ultimate length. The substructure, however, is completed for the entire building.

The excavation for the power house substructure was entirely in rock on a comparatively flat site immediately adjoining the river. In order to obtain sufficient area under the turbines to permit the spent water to discharge into the river, it was necessary to excavate the rock for a depth of 25 feet below the surface of the river. To enable this work to be done in the dry, the rock shore adjacent to the river was left undisturbed so that it formed a dam between the river and the work. It proved to be very watertight, only one small pump, operating intermittently being required to maintain the site free from the usual water difficulties. This favourable circumstance enabled a high quality of foundation work to be done in this vital part of the plant and at the same time afforded an exceptional opportunity to make a thorough examination of the underlying rock strata, which proved to be dense and sound. At no point was any sign of settlement apparent.

The excavation was straight rock work, the spoil being removed by dump car over a siding which was built along the river edge. This railway also served to bring in material from the sorting yard located near Queenston.

For concreting, a large mixing plant was stationed on the face of the escarpment a short distance from the top. From this plant the concrete was chuted through suspended troughs to the work. Relay towers were erected at various points from which the concrete was re-directed as necessary.

The steel erection was carried out by means of a two-derrick wooden traveller on wheels.

Mr. John Wilson, Jr., who for the past fifteen years has been associated with the sales organization of the Dominion Bridge Company and its subsidiary companies, the Dominion Engineering Works, and the Structural Steel Company, has accepted the position of sales-manager with the Walsh Plate & Structural Works Limited of Drummondville, Que. Mr. Wilson assumed his new position on March 1.

The Diamond State Fibre Company are distributing Catalogue No. 20, covering Condensite Celoron, which may be had upon request. Condensite Celoron is made especially for radio panel work and is furnished in three grades: Condensite Celoron Fibre Veneer; Shielded Condensite Celoron; and Condensite Celoron Grade 10. All these can be furnished in full sheets, or panels cut to size or machined to customers' specifications.

Electrical Co-operative Association Province of Quebec, boosting business

Montreal's Electric Home Display

Arousing interest of thousands of well-to-do citizens who are eager to learn more of the use of electricity and to experience the comforts and luxuries it affords in well-wired homes

Apart from the purely organization aspects the most important work of the Electrical Co-Operative Association of the Province of Quebec since its formation is the Montreal Electrical Home movement. The Association's work may be broadly divided into two parts—that appertaining to questions affecting the industry itself and that relating to the promotion of sales of electrical appliances. The latter naturally brings the Association, through its members, in contact with the general public, which is for the most part lacking in appreciation of the value of the manifold services which electricity can render.

Experience in every line of business shows that if substantial results are to be secured something more that a mere casual attempt to secure trade must be made. A persistant follow-up system is imperative.

There is a wide field for the energies of the contractor-dealers, the supply houses, and the light and power companies. The Electrical Home may be described as a wedge which provides the opening for the contractor-dealer in particular, who will miss one of the best opportunities ever given him if he neglects to turn to account, and to translate into dollars and cents, the educational work begun at the Electrical Home. The success of such an exhibition must necessarily benefit all sections of the industry.

As has been frequently pointed out some contractor-dealers are in a sense responsible for the small amounts spent on wiring. In their eagerness to secure contracts they have of their own accord cut down the number of outlets and other work when tendering for jobs. The result is that building companies, general contractors, and private persons who construct houses spend as little as possible on electrical work. They give great attention to plumbing and heating and other essentials, but hardly spare a thought on wiring and convenience outlets with the result that the sums appropriated for this work are absolutely ridiculous. Builders and architects and even electrical contractor-dealers need a lot of education on such points, and the Electrical Home is one of the best means for driving home the lesson of better and more wiring.

Organization Plans

The great advantage of the Modern Electrical Home lies in the fact that it provides a medium for demonstration, and demonstration constitutes the most effective selling argument in the world. The public is shown the convenience of the various outlets and also the utility and economy of the appliances, a far more potent method than a mere general talk which often leads nowhere. The purchase of all the electrical appliances shown would involve a considerable sum and probably few of the visitors could make such an outlay at once, but most of them could buy one, two, three or more, and add to their stock from time to time. In this way the Home is educating the public to do things electrically to a far greater extent that at present, and is also educating the public on the advisibility of making provision in the way of additional outlets for present and future needs.

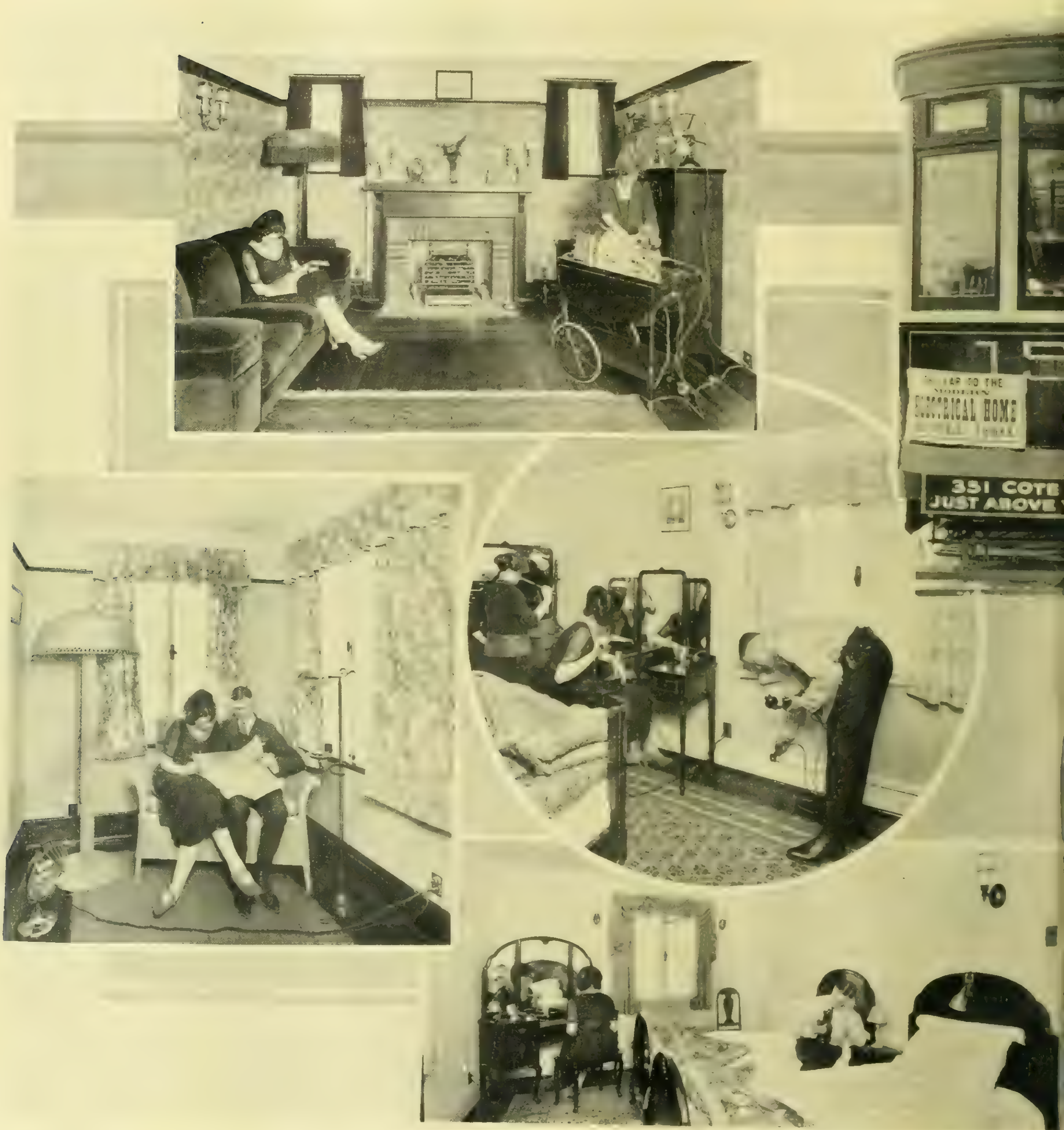
The organization of the Electrical Home involved an amount of work which only those who participated in the campaign can appreciate. As far back as December preliminary preparations were made, but certain obstacles had to be overcome before definite headway could be made. First a vacant house had to be secured, then arrangements made for its furnishing and equipping with appliances, and finally the active co-operation of all departments of the industry definitely obtained. Mr. Louis Kon, the secretary of the Electrical Co-operative Association, Province of Quebec, planned and superintended the general arrangements, receiving generous assistance from Mr. Kenneth A. McIntyre, the Canadian representative of the Society for Electrical Development. Mr. McIntyre made two visits to Montreal, on the first occassion addressing three meetings of the contractor-dealers and jobbers and the Electrical Co-operative Association, detailing his experience with the Electrical Home in Toronto and describing how matters were dealt with in that city. Mr. Kon was unceasing in his endeavors to make the campaign a success, and with the happiest results, particularly when it is remembered that he had no large fund of money to draw on.

Unlike Toronto, there was only one committee, the House Committee, which controlled the arrangements for taking care of the visitors. The committee consisted of Messrs. C. Slimpin, assistant manager, Montreal Light Heat & Power Consolidated, chairman; George Atcheson, superintendent of merchandising department, Southern Canada Power Co., vice-chairman; J. P. Sullivan, Canadian Electrical Supply Company; C. C. McGovern, sales-manager, Appliance Department, Northern Electric; J. A. Anderson, president of the Contractor-Dealers' Association (English Section); Lee Jones, superintendent of sales, Canadian General Electric; J. W. Tremblay, director, Contractor-Dealers' Association (French section); N. W. Fairley, sales-manager, Monarch Electric Co.; W. S. Parke, eastern representative Renfrew Electric Company; J. B. Woodford, Bell Telephone Company; Norman Clarke, eastern representative, National Electric Heating Co.; P. E. Ostiguy, Aqua Electric Heater Company; Fred. Baker, eastern rep. Canadian Edison Appliance Company; and J. A. St. Amour, director Contractor-Dealers' Association (French section). Messrs. E. W., Smith, Northern Electric Company, and C. B. Caulson, Canadian General Electric, acted as general assistants to the chairman of the committee. The committee found no difficulty in securing all the help they needed, a practical illustration of the co-operative spirit which is the basis of the associaton.

Publicity

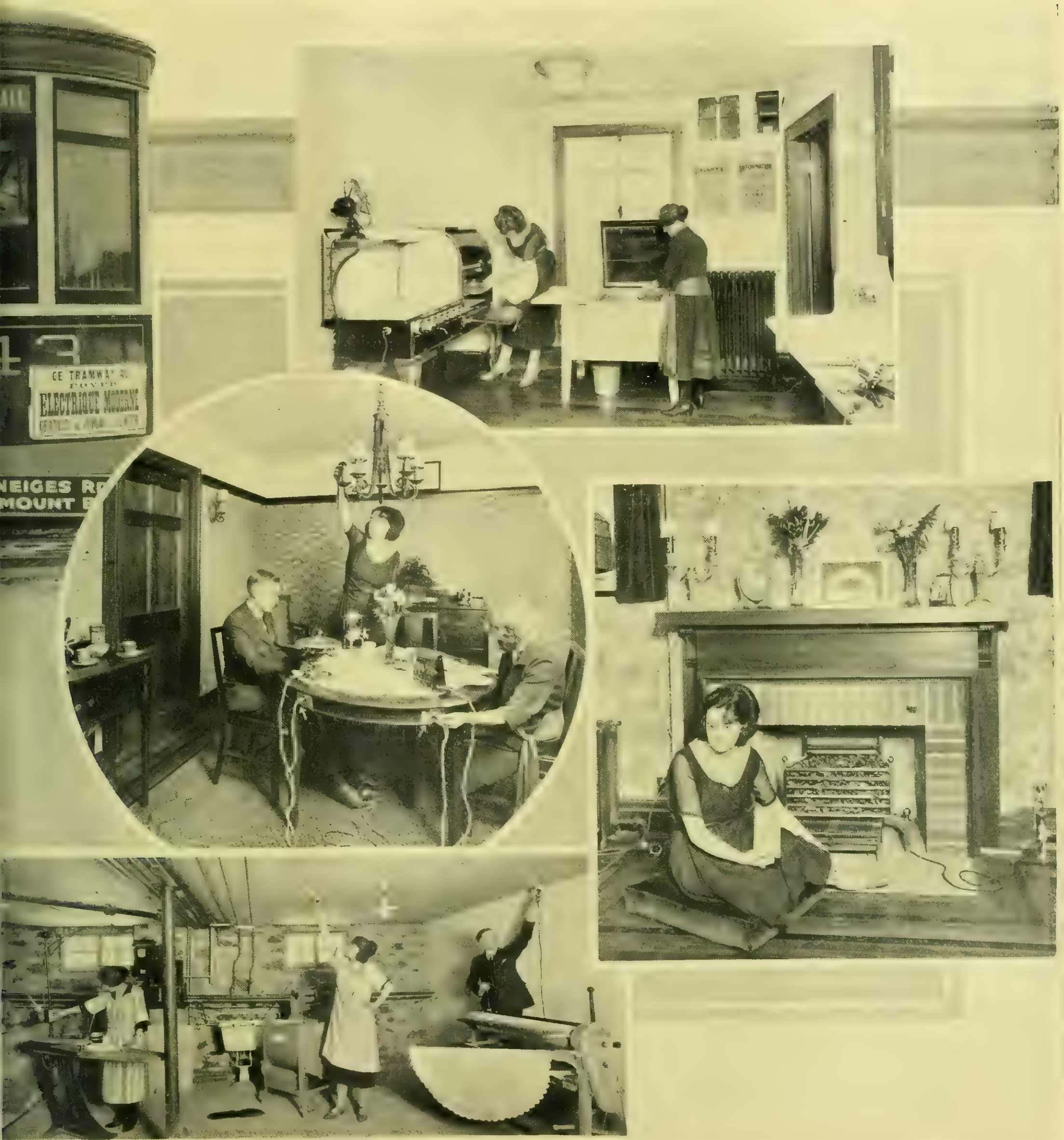
Publicity in such a matter as the Electrical Home is of the first importance. The association received a certain amount of help from the newspapers, and in other directions were the recipients of hearty support. For instance, the Montreal Tramways Company allowed the Association to display posters, in French and English, on the cars and also gave permission for electrical signs to be displayed on their poles. The Montreal Light, Heat & Power Consolidated and Montreal Public Service Corporation used space in the daily press, referring to the Home. The association issued a large number of stickers which were freely used by depart-

"Co-operatives" in Montreal Demonstrate



Living-Room—Besides what you see there are two more convenience outlets in this room for an electric gramophone, the use of a vacuu
of light throughout, including one over the sink, a convenience outlet for a dishwasher and a duplex one on the kitchen cabinet for a ge
Here is the best illustration of the advantages of a duplex convenience outlet. Mark the heater cord stretched on the floor, becaus
plug telephones, self-lighting clothes closet and well distributed bracket lights controlled by a switch make the bedrooms conven
besides those seen: one next to the serving table and one near the sideboard. Basement—Convenience outlets in a basement shoul
The 26 thousand subscribers of the Montreal Gazette might have missed the most important news but they could not have missed s

odel Electric Home for Public Inspection



eaner and placing of the wired tea-wagon or portable lamps where required. It saves steps and avoids crowding. Kitchen—Plenty
utility motor or use of any useful appliance, and an electric range make a fully modern kitchen in a fully modern home. Sun Parlor—
re is a single outlet instead of a duplex. The Bedrooms—Convenience outlets on the side of the beds and dressing tables, jack and
Dining Room—The old and the new ways of getting "juice" for the table appliances. There are two duplex convenience outlets
placed in the ceiling. It prevents the dragging of cords on wet floors. A pilot light on the ironing board saves the iron and current.
the picture of the street car of the Montreal Tramways Company shown in the centre above.

mental stores, the Bell Telephone Company and the light and power companies. The members of the Electrical Co-operative Luncheon also gave considerable assistance. They were present at the official opening of the Home, being conveyed in special cars placed at their disposal by the Tramways Company.

The roads approaching the House, situated at 351 Cote des Neiges Road, were liberally dotted with signs so as to guide the visitors by day and night. At the commencement of the road leading to the Home there was a large sign in French and English inviting a "A Visit to the Montreal Electrical Home—Wired for Every Convenience." Then as the visitors turned in the path to the Home they received a "Welcome to the Modern Electrical Home—Bienvenue au Foyer Electrique Moderne." At night a large flood light mounted on a pole was directed onto the Home and in this way it was easy for visitors to find their way after leaving the tramcars.

The Electrical Home

The House was one of a group centrally heated. It consisted of nine rooms and two bathrooms on two floors. It was furnished—and very tastefully furnished too— by N. G. Valiquette, Limited, Montreal, The electrical equipment was supplied by members of the association, but in every case the indentification marks were either removed or so covered up as to preclude possibility of the names of the manufacturers being known. In the event of the demonstrator being asked as to the make of any of the appliances, the visitor was assured that the object was not to sell any given type but that information regarding such goods could be obtained from any electrical firm whose name appeared on the printed list distributed. Emphasis was, indeed, laid on the fact that, in the ordinary sense of the term, the Campaign was not a commercial one—it was educational in its scope. The wiring was done by the owners of the house, at their expense, and by a contractor selected by them.

With a limited amount of accomodation it was of course necessary to adopt a plan by which overcrowding was avoided and the visitors given an opportunity of hearing and understanding the different demonstrators in charge of the rooms. At the periods of the largest attendances, the visitors were admitted in groups. The objects of the Home were first of all explained, special attention being directed to the wiring—the necessity and economy of good wiring and the importance of its being of sufficient capacity—followed by a reference to the convenient outlets in the room. The visitors then passed on to the other rooms in turn where those in charge explained and demonstrated briefly the objects of the various outlets and the convenience of the appliances. Other groups were admitted as the space became vacant, an attendant regulating the entrance of the groups in turn.

General Wiring Plan

On the ground floor of the Home are four rooms. The sun-parlor calls for little comment except to say that there are two duplex convenience outlets for a heater, fan,portable lamp or other use. The living room has a large number of outlets for candelabra, portable lamps, electric fireplace and heater, fan, and tea wagon, the latter wired for connection to any outlet in the room. Then there are duplex outlets for the gramophone and the portable lamp. Owing to the height of the ceiling, the illumination scheme is by four double wall brackets.

In the dining room, adjoining, the wired dining table attracted the chief attention. The electricity is supplied through a floor outlet, and distributed by means of outlets in the table, for a toaster, chafing dish or any other appliance. Outlets are made in different parts of the room for grill and egg boiler, candlesticks, etc. The illumination consists of a central fixture for five candlesticks and two brackets, giving abundant light without glare and harmonizing with the general decorative scheme. The butler's pantry is provided with a duplex outlet for a plate warmer, while the kitchen has a number of outlets for appliances designed to save labor and to insure efficiency in cooking and other domestic work, such as an electric range, a dish washer, a vacuum cleaner, a disc heater, and a general utility motor for whipping cream, grinding cutlery, and buffing the silverware. The maid's room contains a duplex outlet to connect with an adjustable lamp for the sewing machine and also for operating the machine.

The next course was to the basement where visitors were given details, and saw demonstrations, of the ironing machine for large pieces, with the sad electric iron and the attached pilot lamp; the instantaneous water heater enabling hot water to be supplied by merely turning the tap; and the electric washing machine. The outlets are placed in the ceiling in order to avoid cords dragging on the floor.

A special desk was provided in the basement for the purpose of securing the names and addresses of those interested in getting any special information as to the various electrical features.

The second floor consists mainly of bedrooms—the main bedroom, second bedroom and the child's room. In the first named, between the twin beds, there is a duplex outlet for a boudoir lamp, with provision for a jack and plug telephone connection. Near the dressing table, a duplex outlet is shown for a hair drier and massage vibrator and for other toilet appliances. In the next room are outlets for heating pads and dimmer light, violet rays and curling tongs. The lighting in both rooms is by brackets with silk and parchment shades. The nursery has outlets for a portable heater, bed-warmer, and a transformer for electric toys. In each bathroom lights are set on both sides of the washing basins and mirrors, while a single outlet gives a connection for an immersion water heater. A small den has outlets for reading lamp, cigar lighter, fan or percolator.

All cupbords are equipped with lights, controlled by switches, putting the lights on or off automatically by the opening and closing of the doors. An inter-communicating telephone system and jack and plug extensions are installed, enabling communication to be secured in all parts of the house.

Improving on "Yesterday"

The visitors were not allowed to depart without literature in order to deepen the impression of the demonstration. This literature was in the form of a folder—"Improve on Yesterday—Home Comfort and Economy through the use of Electric Service". The folder gave a brief description of the advantages and conveniences of electricity as applied to illumination, domestic work, and the home. Visitors were invited to consider the house in the two-fold function of a home and domestic work-shop, and "See what the Service of Electricity can give you." One page, entitled "The Modern Electrical Home," read as follows:—

So rapidly has the Electrical industry, particularly in its application to the home, advanced in recent years, that it has been difficult for the average man or women to keep pace with its development.

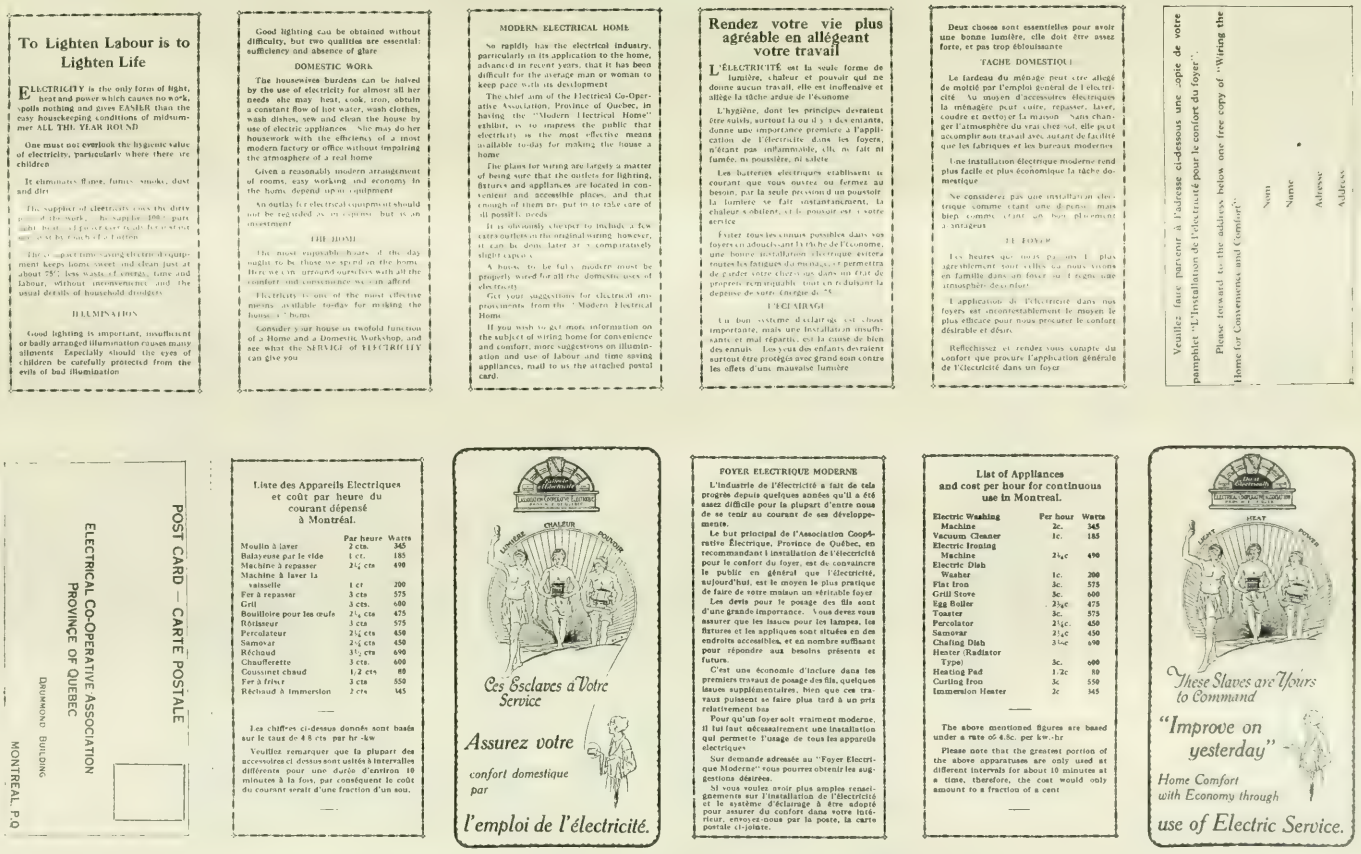
"The chief aim of the Electrical Co-Operative Association, Province of Quebec, in having the "Modern Electrical Home" exhibit, is to impress the public that electricity is the most effective means available to-day for making the house a home.

"The plans for wiring are largely a matter of being sure that the outlets for lighting, fixtures and appliances are located in convenient and accessible places, and that enough of them are put in to take care of all possible needs.

"It is obviously cheaper to include a few extra outlets in the original wiring; however, it can be done later at a comparatively slight expense.

"A house to be fully modern must be properly wired for all the domestic uses of electricity.

"Get your suggestions for electrical improvements from



To Lighten Labour is to Lighten Life

ELECTRICITY is the only form of light, heat and power which causes no work, spoils nothing and gives EASIER than the easy housekeeping conditions of midsummer ALL THE YEAR ROUND

One must not overlook the hygienic value of electricity, particularly where there are children

It eliminates flame, fumes, smoke, dust and dirt

The supplier of electricity does the dirty part of the work. He supplies 100% pure light, heat and power ever ready for instant use just by touch of a button

The compact time saving electrical equipment keeps home sweet and clean just at about 75% less waste of energy, time and labour, without inconvenience and the usual details of household drudgery

ILLUMINATION

Good lighting is important, insufficient or badly arranged illumination causes many ailments. Especially should the eyes of children be carefully protected from the evils of bad illumination

Good lighting can be obtained without difficulty, but two qualities are essential: sufficiency and absence of glare

DOMESTIC WORK

The housewives burdens can be halved by the use of electricity for almost all her needs. She may heat, cook, iron, obtain a constant flow of hot water, wash clothes, wash dishes, sew and clean the house by use of electric appliances. She may do her housework with the efficiency of a most modern factory or office without impairing the atmosphere of a real home

Given a reasonably modern arrangement of rooms, easy working and economy in the home depend upon equipment

An outlay for electrical equipment should not be regarded as an expense, but is an investment

THE HOME

The most enjoyable hours of the day ought to be those we spend in the home. Here we can surround ourselves with all the comfort and convenience we can afford

Electricity is one of the most effective means available to-day for making the house a home

Consider your house in twofold function of a Home and a Domestic Workshop, and see what the SERVICE of ELECTRICITY can give you

MODERN ELECTRICAL HOME

So rapidly has the electrical industry, particularly in its application to the home, advanced in recent years, that it has been difficult for the average man or woman to keep pace with its development

The chief aim of the Electrical Co-Operative Association, Province of Quebec, in having the "Modern Electrical Home" exhibit, is to impress the public that electricity is the most effective means available to-day for making the house a home

The plans for wiring are largely a matter of being sure that the outlets for lighting, fixtures and appliances are located in convenient and accessible places, and that enough of them are put in to take care of all possible needs

It is obviously cheaper to include a few extra outlets in the original wiring, however, it can be done later at a comparatively slight expense

A house to be fully modern must be properly wired for all the domestic uses of electricity

Get your suggestions for electrical improvements from the "Modern Electrical Home"

If you wish to get more information on the subject of wiring home for convenience and comfort, more suggestions on illumination and use of labour and time saving appliances, mail to us the attached postal card.

Rendez votre vie plus agréable en allégeant votre travail

L'ÉLECTRICITÉ est la seule forme de lumière, chaleur et pouvoir qui ne donne aucun travail, elle est inoffensive et allège la tâche ardue de l'économe

L'hygiène, dont les principes devraient être suivis, surtout là où il y a des enfants, donne une importance première à l'application de l'électricité dans les foyers, n'étant pas inflammable, elle ne fait ni fumée, ni poussière, ni saleté

Les batteries électriques établissent le courant que vous ouvrez ou fermez au besoin, par la seule pression d'un poussoir la lumière se fait instantanément, la chaleur s'obtient, et le pouvoir est à votre service

Évitez tous les ennuis possibles dans vos foyers en adoucissant la tâche de l'économe, une bonne installation électrique évitera toutes les fatigues du ménage, et permettra de garder votre chez-vous dans un état de propreté remarquable tout en réduisant la dépense de votre énergie de 75%

L'ÉCLAIRAGE

Un bon système d'éclairage est chose importante, mais une installation insuffisante et mal répartie, est la cause de bien des ennuis. Les yeux des enfants devraient surtout être protégés avec grand soin contre les effets d'une mauvaise lumière

Deux choses sont essentielles pour avoir une bonne lumière, elle doit être assez forte, et pas trop éblouissante

TACHE DOMESTIQUE

Le fardeau du ménage peut être allégé de moitié par l'emploi général de l'électricité. Au moyen d'accessoires électriques la ménagère peut cuire, repasser, laver, coudre et nettoyer la maison. Sans changer l'atmosphère du vrai chez soi, elle peut accomplir son travail avec autant de facilité que les fabriques et les bureaux modernes

Une installation électrique moderne rend plus facile et plus économique la tâche domestique

Ne considérez pas une installation électrique comme étant une dépense, mais bien comme étant un bon placement avantageux

LE FOYER

Les heures que nous passons le plus agréablement sont celles où nous vivons en famille dans un foyer où il règne une atmosphère de confort

L'application de l'électricité dans nos foyers est incontestablement le moyen le plus efficace pour nous procurer le confort désirable et désiré

Réfléchissez et rendez-vous compte du confort que procure l'application générale de l'électricité dans un foyer

Veuillez faire parvenir à l'adresse ci-dessous une copie de votre pamphlet "L'Installation de l'électricité pour le confort du foyer".

Please forward to the address below one free copy of "Wiring the Home for Convenience and Comfort".

Nom

Name

Adresse

Address

POST CARD — CARTE POSTALE

ELECTRICAL CO-OPERATIVE ASSOCIATION
PROVINCE OF QUEBEC

DRUMMOND BUILDING

MONTREAL, P.Q

Liste des Appareils Electriques et coût par heure du courant dépensé à Montréal.

	Par heure	Watts
Moulin à laver	2 cts.	345
Balayeuse par le vide	1 ct.	185
Machine à repasser	2¼ cts	490
Machine à laver la vaisselle	1 ct	200
Fer à repasser	3 cts	575
Gril	3 cts.	600
Bouilloire pour les œufs	2¼ cts	475
Rôtisseur	3 cts	575
Percolateur	2¼ cts	450
Samovar	2¼ cts	450
Réchaud	3½ cts	690
Chaufferette	3 cts.	600
Coussinet chaud	1/2 cts	80
Fer à friser	3 cts	550
Réchaud à immersion	2 cts	345

Les chiffres ci-dessus donnés sont basés sur le taux de 4.8 cts par hr.-kw

Veuillez remarquer que la plupart des accessoires ci-dessus sont usités à intervalles différents pour une durée d'environ 10 minutes à la fois, par conséquent le coût du courant serait d'une fraction d'un sou.

Ces Esclaves à Votre Service

Assurez votre confort domestique par l'emploi de l'électricité.

FOYER ELECTRIQUE MODERNE

L'industrie de l'électricité a fait de tels progrès depuis quelques années qu'il a été assez difficile pour la plupart d'entre nous de se tenir au courant de ses développements.

Le but principal de l'Association Coopérative Électrique, Province de Québec, en recommandant l'installation de l'électricité pour le confort du foyer, est de convaincre le public en général que l'électricité, aujourd'hui, est le moyen le plus pratique de faire de votre maison un véritable foyer

Les devis pour le posage des fils sont d'une grande importance. Vous devez vous assurer que les issues pour les lampes, les fixtures et les appliques sont situées en des endroits accessibles, et en nombre suffisant pour répondre aux besoins présents et futurs.

C'est une économie d'inclure dans les premiers travaux de posage des fils, quelques issues supplémentaires, bien que ces travaux puissent se faire plus tard à un prix relativement bas

Pour qu'un foyer soit vraiment moderne, il lui faut nécessairement une installation qui permette l'usage de tous les appareils électriques

Sur demande adressée au "Foyer Electrique Moderne" vous pourrez obtenir les suggestions désirées.

Si vous voulez avoir plus amples renseignements sur l'installation de l'électricité et le système d'éclairage à être adopté pour assurer du confort dans votre intérieur, envoyez-nous par la poste, la carte postale ci-jointe.

List of Appliances and cost per hour for continuous use in Montreal.

	Per hour	Watts
Electric Washing Machine	2c.	345
Vacuum Cleaner	1c.	185
Electric Ironing Machine	2¼c	490
Electric Dish Washer	1c.	200
Flat Iron	3c.	575
Grill Stove	3c.	600
Egg Boiler	2¼c	475
Toaster	3c.	575
Percolator	2¼c.	450
Samovar	2¼c	450
Chafing Dish	3½c	690
Heater (Radiator Type)	3c.	600
Heating Pad	1/2c	80
Curling Iron	3c	550
Immersion Heater	2c	345

The above mentioned figures are based under a rate of 4.8c. per kw.-hr

Please note that the greatest portion of the above apparatuses are only used at different intervals for about 10 minutes at a time, therefore, the cost would only amount to a fraction of a cent

These Slaves are Yours to Command

"Improve on yesterday"

Home Comfort with Economy through use of Electric Service.

Reproduction of both sides of a six leaf folder distributed by the Electrical Co-operative Association to the visitors to the Electrical Home at present showing in Montreal the "Modern Electrical Home."

"If you wish to get more information on the subject of wiring a home for convenience and comfort, more suggestions on illumination and use of labor and time saving appliances, mail to us the attached postal card."

A postcard, section of the folder, addressed to the Electrical Co-operative Association, Province of Quebec, requested a free copy of "Wiring the house for Convenience and Comfort." The last page of the folder gave a list of the appliances and the cost of electricity for continuous use. in Montreal

	Per hour	Watts
Electric Washing Machine	2c.	345
Vacuum Cleaner	1c.	185
Electric Ironing Machine	2¼c.	490
Electric Dish Washer	1c.	200
Flat Iron	3c.	575
Grill Stove	3c.	600
Egg Boiler	2¼c	475
Toaster	3c.	575
Percolator	2¼c	450
Samovar	2¼c.	450
Chafing Dish	3½c.	690
Heater (Radiator Type)	3c.	600
Heating Pad	1/2c.	80
Curling Iron	3c.	550
Immersion Heater	2c.	345

The above mentioned figures are based under a rate of 4.8c. kw.-hr.

Please note that the greatest portion of the above apparatuses are only used at different intervals for about 10 minutes at a time, therefore, the cost would only amount to a fraction of a cent.

Besides the folder each visitor was presented with a printed list of wiring contractors, appliance and fixture dealers in the Montreal district.

Mr. Kon has stated that the industry is very much gratified with results, particularly as regards attendance. Although this is not as large as it might be if they were carrying on an advertising campaign in the daily press, they consider they eliminate the merely curious type and that the visitors they do get are eager to be educated on properly wired homes. Regarding results, Mr. Kon adds:

"We average about 300 people a day, children, of course, not counted, and we are in a position to give them individual attention which is already to an extent, fruitful in results. Some very interesting things are transpiring in connection with the Home. I had a couple of builders who built some ninety houses in Notre Dame de Grace district, which is one of the good residential parts of our city, and they were perplexed to see the duplex convenience outlets, and their number in the various rooms, as well as the location of switches and distribution of light fixtures. They admitted that they never knew of these things before. During the conversation I asked them what is the approximate expenditure of plumbing in the houses they build, which I was informed by them would represent 14 to 15 per cent of the cost of the house, but when asked how much they spend on electric wiring per house they would not say any percentage but shamefacedly admitted, "we would not like to say, it is ridiculous, it may be between sixty and seventy-five dollars per house," and they added "we can see where we were wrong".

Then some of the men working for the contractor-dealers who are on duty as hosts in the home, mentioned to me, after the house had been opened for about five days, that they were called by people to bring them duplex convenience outlets and have them installed in the kitchen and sewing-room. the orders being given by men who added, "My wife went to that darn Modern Electrical Home and got the duplex convenience outlet bug in her head, insisting upon having it installed right away." This happened in three or four cases.

"We hope that by the first of May, the time everybody moves in and out in Montreal, our contractors will be very busy properly wiring some of the residences."

The Effect on Members of the Industry

One of the results is not to be computed in dollars and cents. It is the effect upon the members of the industry. In educating the public, those engaged in the work have themselves received benefit, in the way of co-operative effort, and also in the way of enlarging their experience in dealing with electrical subjects. One member who acted as host, and who was dubious as to his ability to talk to the public on the need for better wiring, confessed that his experience had been of immense value to himself, and that it enabled him to deal in a much more capable manner with customers in the matter of wiring and appliances. Besides this, contractor-dealers who previously lacked the imagination—if we may put it that way—to suggest duplex convenience outlets to prospective customers, are now alive to the possibilities of increased business in this direction, and are putting this matter before their clients. The Home has also had the effect of cementing the industry, of promoting that get-together spirit which is so essential to the progress of any movement, and which makes for the better understanding between different sections.

Inquiries Coming In

Although the full results cannot be tabulated at this stage sufficient data is available to be able to state that the industry will receive appreciable material benefit. Inquiries are daily coming in. Many replies have been received to the invitation to write for the pamphlet, "Wiring the Home For Convenience and Comfort". These are passed on to the Contractor Dealers' Association to be dealt with. As an example of direct results we may mention that one visitor wrote for information as to where he could get certain work done, the outcome being an order for wiring a house, for an electric pump, an electric washer, etc. Another result was the visit of an architect who is drawing plans for some houses. He went in response to the request of his client, who had previously inspected the house, and desired the architect to get some ideas on convenience outlets. In yet another instance a contractor who was doing work was instructed to put in some convenience outlets; he was told that the order was due to the wife of the client visiting the Home.

Wiring Dressing Tables

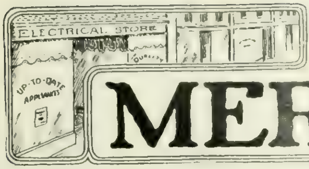
Some of the C. P. R. officials connected with the company's hotels department were among the visitors. It has been decided to put in wired dressing tables for curling tongs and other appliances in the bedrooms of the Chateau Frontenac, Quebec City, and also to install special reading lamps over the beds.

An average attendance was 300 people per day. It was noticeable that husbands who inspected the Home made a second visit, bringing their wives, and vice versa.

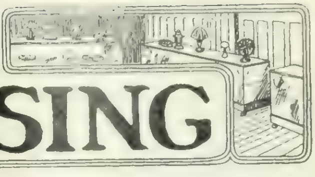
The women's organizations—Montreal Housewives League, Local Council of Women, and Montreal Women's Club—have been lined up. At first there was a little difficulty in this matter, owing to an impression that the Home was a mere advertising exhibition, but after a visit of the president of the Montreal Housewives League, this idea was speedily removed, and a meeting of the organizations was held in the Home. The students of the domestic science classes of the High Schools, and the students of Macdonald College also visited the Home.

Other Homes to Follow

Four other Homes in different parts of the city will be wired and furnished. These will be held in April, May, September and October. At the meeting of the Electrical Co-operative Association on March 7, the following committee were appointed to take charge of the different branches of these Homes—House (the old committee was made permanent), Wiring, Financial, Advertising & Publicity, Illumination, and Appliance.



BETTER MERCHANDISING



$10,500,000 for the Contractor and Dealer in 1922, in New Homes Alone

Great house building activity during the present season seems a foregone conclusion. Rents are to-day at the highest point in history; the house shortage continues to accumulate; material and labor costs are down, and money is more easily available for mortgages. Following an unusually mild winter contractors have already commenced active operations.

Canada's building program for 1922 includes 30,000 new homes.

These will range in value, mostly, from $3,000 to $20,000. The average will be around $5,000.

Thirty thousand homes at five thousand each is $150,000,000.

If the Electrical Industry does its part—"sells" the architect and owner—the wiring of these homes will run into five per cent.

There is no place in the electrical industry for the "two per cent." contractor. To accept a house contract for less than five per cent. of the total value admits lack of confidence in our own product.

Five per cent of one hundred and fifty millions is $7,500,000 **for wiring alone.**

Electrical equipment may well add another five per cent.—let's say two per cent. and be on the safe side.

Two per cent. of one hundred and fifty millions is $3,000,000.

$10,500,000, in all for Canadian contractors and dealers, **in new homes.**

In addition, there are all the unwired homes, the poorly, partly wired and the homes with little or no equipment.

These are facts. In face of them, the man who **thinks depression** had better look for the cause withni himself.

Hamilton Will Open Electric Home in May—Plans Well Advanced

[illegible] meeting of the Hamilton District Electrical Association was held March 1, in the Board Room of the Y. M. C. A. where dinner was served at 6.30 p.m. A report was received from the Hamilton Electrical Development League on the Electric Home as follows:

"It is expected the Electric Home will be opened on or about May 15.

"Mr. Norman Ellis has been selected by the Realtors' Association to provide the Electric Home for exhibition. This home will be erected on Main St. E. near Sherman Ave.

"The Arcade Ltd. have agreed to decorate and furnish the Electric Home throughout. Arrangements have been made for the installation of a wireless outfit and persons visiting the Home in the evenings will have an opportunity of hearing wireless concerts.

"Special electrical effects will be used each evening during the exhibition of the Electric Home. It was reported 20,000 people visited the Electric Home in Toronto which was on exhibition for 13 days.

"Nothing will be sold at the Electric Home during the exhibition as the object of this Home is to show the advantages in the increased use of labor-saving devices and better wiring for the home."

Mr. V. K. Stalford introduced the speaker of the evening Mr. Russell T. Kelly of the Hamilton Advertisers, Ltd. Mr. Kelly's subject was "Better Business and More Business" and the address was appreciated by all present.

Mr George Foot, on behalf of the Canadian Westinghouse Company, presented each person present with a beautifully mounted photograph of the largest generator in the world which is now set up in the plant of the Canadian Westinghouse Co. at Hamilton. Mr. J. Culley, of Culley and Breay, in a few remarks in behalf of the Hamilton District Electrical Association thanked Mr. Foot and the Canadian Westinghouse Company for the great interest they have shown in the Hamilton District Electrical Association.

The LampBusiness—Is There Anything Wrong

Vancouver, B. C.

Editor Electrical News:—

In the hope of getting expressions of opinion from other quarters, I am bringing the above matter to the notice of your readers after soliloquized over it for several months.

We sign a contract with a lamp manufacturer to take say, $15,000 worth of his lamps in a period of 12 months which entitles us to a discount of 33% with an extra cash discount of 5% and although many doubtless take advantage of the latter, yet I will show later why it should not enter into the discussion, and it would be fair to call our discount merely 33%—we being in a business on which our bread and butter depends on the number of lamps and other electrical material and appliances we sell.

We then turn 'round to the consumer to sell our lamps and what happens? What are we compelled to do? To any man, whether he be a lumberman, owner of an apartment house, butcher or second hand dealer. if he purchases $150. worth of lamps in a period of 12 months, being one one-hundredth part of the lamps we purchase, we have to give him 17% or a fraction over 50% of our discount. But there is worse to come. If the same type of consumer should purchase $2,500 worth, being one-sixth of the lamps we purchase. we have to give him 29%, or 88% of our discount—and I leave the cash discount we receive out of the question as it is more than offset by the two, three and sometimes four months that we have to wait for our money.

Let us [illegible] for a moment the consumer, and let us take, for example, the stores of P. Burns & Co. I quote this company solely because I know that they are among those who get these ridiculous discounts: they purchase lamps, not for resale but for the operation of their business, in the same way as they have to purchase wrapping paper, stationery and other things. But are the vendors of these other goods found giving such enormous discounts; or on the other hand, if one buys meat to the value of $150 worth in 12 months as many electrical men do, does one's butcher offer 17%?

This is merely an example of hundreds of similar cases of consumers all purchasing lamps which should be reckoned as part of their overhead expense and which I maintain should be entitled to a maximum of 15% no matter how large a quantity they buy—**they are not earning a living by the electrical business.**

Look for a moment at another side to this matter and let us ask ourselves "If the present consumers' discounts were cut in half, would the manufacturers suffer? They would only suffer if there were fewer lamps sold. and the possibility of this happening is so remote that it hardly merits discussion.

If my theory is wrong, I shall be very glad to be enlightened on the subject. If on the other hand a wrong exists, it means that real cash is now being handed to the consumer which legitimately belongs to the electrical dealer. If this is true, I believe we have only to point the matter out to the manufacturer in the proper manner, to get it remedied. What, I ask, is the opinion of your readers.

Yours very truly.

E. Brettell

National Co-operation

March 8 was one of the dates set apart by the Montreal Electrical Co-operative Luncheon for a speaker secured by the Electrical Co-operative Association of the Province of Quebec. The address was by Mr. Walter J. Francis, Montreal, whose subject was the appropriate one of "National Co-operation." He referred to the wide-spread efforts to co-operate by associations throughout the Dominion and stated that co-operation, in its proper sense, was opposed to improper competition. It was the essence of service, helping those who gave as well as those who received. As illustrations of co-operative effort, Mr. Francis mentioned the churches, scientific institutions, and the Boy Scouts. Co-operation had accomplished much in the way of placing professions, on their present high planes.

Mr. Francis discussed, as examples, the co-operative aims of the Rotary and Kiwanis Clubs. He pointed out, as far as the first named is concerned, there are three elements which enter into the service and co-operation—the individual element, that of service, and that of profit. They were all essential if there was to be that co-operation which would give results. Everyone must co-operate, and the organization must be on broad lines which would make for that end. He was satisfied that the electrical industry was working on those lines, and the results would justify the efforts that were being made.

Mr. Richards stated that the Trades Relationship Committee of the Co-operative Association suggested that there should be monthly social gatherings. These would take place in the evening, and would include a light meal, entertainment and dancing. The idea was approved and left to the Entertainment Committee to arrange details.

The Toronto Hydro-electric System has sent out cards announcing a demonstration of electric cooking, at 1151 St. Clair Avenue West, from 2:00 p.m. to 9:30 p.m. on the dates March 8 to March 25, inclusive.

Selling Wiring — It Pays to Specialize

An Interesting Story of a Contractor Who Systematically Canvasses His Territory—Entirely Separates the Two Operations of "Selling" and "Wiring"

An interesting story of selling wiring at the rate of $10,000. weekly, one salesman keeping ten journeymen electricians busy, is told by James H. Collins in " Electrical Merchandising." Mr. Collins states that a contractor's advertisement, reading "Houses wired for electricity on monthly payments"was the start of the whole scheme. This advertisement caught the eye of a house builder who at the moment was out of employment The idea of wiring houses on the instalment plan interested him, and he said to the wiring contractor "If you are ready to wire houses on that plan, I'll find customers for you."

Between them they worked out an idea. Most wiring contracts were made with people building new houses, but this instalment plan ought to put wiring within reach of thousands of people living in finished houses. Most wiring contract jobs are landed by salesmen for individual contractors working in competition with each other, and there isn't always enough new construction to go around. But suppose the whole community could be canvassed for wiring contracts on old construction—couldn't enough business be found to keep all the contractors busy?

This pair made a study of more than $350,000 worth of wiring installations to learn costs and strike an average, and tried out their plan. It was soon clear that they could save at least 5 per cent on selling expenses. With that, they organized a sales company, which is today operating as an independent selling organization for electrical contractors in the most populous section of New Jersey, and covering a number towns and cities. Since they began last summer more than $150,000 worth of wiring has been signed up in that territory, $50,000 worth of it in the six weeks before Christmas when householders met salesmen with the double-barreled objection of hard times and Christmas spending. Every journeyman electrician in that section is working, where before there was a considerable amount of unemployment.

Wiring Jobs Without Expense

When this independent sales organization makes an agreement with an electrical contractor to secure for him at least $50,000 worth of wiring jobs without expense to himself, it is so attractive a proposal that he usually signs immediately. In a little while he is working full tilt at wiring, and nothing else. With his own sales force, at least half his attention was given to sales problems. He has to advertise for salesmen, interview applicants, try them out, train them one by one and replace them. If his business ran to even a moderate volume, he would need a sales manager. Under the new plan he concentrates on wiring, and all his wiring and training goes into building up and supervising a more efficient technical force.

This sales organization now has 150 canvassers at work, few of them with electrical training, or even selling experience. Almost any intelligent, willing fellow can be turned into a capable canvasser in ten days, because he is trained and supervised by men who devote all their time to sales work.

"Why hard times is one of our best selling arguments!" said one of the partners. "Last week some of our men began to slack up because people did not want to talk wiring until after Christmas—needed all their money for presents, were busy shopping, and so on. 'How many of you boys have a prospect like that—willing to talk wiring, but not until after Christmas, I asked. Three salesmen said they each had such a prospect in mind. I went out with those three fellows and closed the first contract in twenty minutes, the second in fifteen minutes, and the third in an hour. In each case the argument was 'hard times.' 'You have the money to wire your home,' I told them. 'There are thousands of men out of work. If you order this job done now instead of waiting, you will have the comfort of electric light and convenience that much sooner, and you will do your share in making a Merry Christmas for other people by putting them to work.' "

"Hard Times" A Good Sales Argument

"We have emphasized that so persistently that we would miss the hard times argument if there was a sudden prosperity boom. We are not only selling wiring, but trying to find work for men. One salesman can keep ten journeymen electricians at work. Besides 700 or 800 additional mechanics who have been given employment by our organization, many more have been taken on by the electrical equipment factories and the central stations. Hard times talk is a good sales argument for us, but apart from that I have no patience with it. Hard times is largely marking time—if people would stop talking about depression and get busy, they would find, as we have, that there is money to be spent and business to be got if they will go after it."

Under the agreement made with electrical contractors, this sales organization promises $50,000 worth of wiring and fixture sales within twelve months, $16,000 worth in four months. Moreover, this business is to be found entirely in finished houses, so it does not interfere with new construction jobs. The contractor pays $200 bonus when he signs, furnishes desk room for salesmen, and pays a sales commission weekly on all business turned in, settlement being made each Saturday for contracts closed up to the previous Wednesday. The sales organization operates independently of the contractor and also of central station, manufacturing and jobbing interests. It advertises in the daily papers, offering house wiring on the instalment plan. The contractor also agrees to put a certain amount of advertising on his motor trucks and get behind the general idea.

Combing Neglected Territory

Probably the strongest point in this sales plan is that canvassers work in comparatively neglected territory, and cover it thoroughly. Though many households have been solicited by contractors' salesmen, most of their sales activity has been concentrated on new construction, and in seeking business among people living in unwired houses, there has been a tendency to pick and choose the most promising prospects. This organization pulls every door bell in the block, the only prospects passed by being people living in rented homes in sections where rents obviously will not permit an outlay for wiring.

An old sales story in nearly every line of business is that about the salesman who complained that his territory, a mile square, was "worked out." Whereupon his boss gave him a single block, saying, "Let that be your territory," with the outcome that the salesman had to visit every house and office in that block, and found more business than he had got from his square mile of territory. That this principle will work in wiring is shown in the fact that even a metropolitan section like Newark has three unwired houses for every one that is wired. Estimating 100,000 homes in the city and that a contract is secured in one of every ten, at the present rate of working, it will take this sales force five years to cover Newark alone, and when the job is done, it could start right over again!

Householder Invariably Interested

Calling at an unwired house, the salesman explains that he represents a group of electrical contractors, and would appreciate the opportunity of examining the house and submitting an estimate for wiring. The householder may not be ready to have the work done then, but he is usually interested in knowing what it will cost. The salesman has average figures, and also a schedule blank covering property floor by floor and room by room. When this is filled out, it gives a record of the number of outlets and fixtures, as well as the character and condition of the building. A rough estimate can be given on the spot, with the distinct understanding that it is only an estimate—a definite price will be submitted if asked for, and it may be lower. As a matter of policy, average wiring prices in a given community are neither cut nor raised—they vary in different sections according to wages and other conditions. Generally, the estimate is lower than the figure most people have in mind for the cost of wiring their homes—so much so that one difficulty is persuading them that a satisfactory and sightly job can be done for the price. Objections are raised—the householder has heard that fires are caused by rats gnawing exposed wires, and does not want his home burned up. When he finds that all work is done with conduit and first-class material, and that the job must conform to fire insurance, municipal and central station requirements, he is reassured.

Sell Electric "Service"

One significant point is that salesmen do not talk or sell electric lighting, but electric service. Householders almost invariably think of wiring in terms of lighting. Electric service with additional outlets for appliances is a viewpoint so new and interesting that they stop thinking of cost for the time being and discuss possibilities with the salesmen, deciding where outlets for fans, irons, heaters and motors will be most convenient.

The salesman's distinction between lighting and "luxury outlets" makes a decided impression on most prospects. The idea of electrical luxury as well as light is novel, and attracts by its suggestion of greater convenience and comfort in the home. Moreover, it is a basis for selling more outlets where the home is already wired.

Asking for permission to look over a home that has been wired for lighting, maybe years ago, the salesman almost invariably finds twin plugs in many lamp sockets, some placed for use with fans, curling irons and the like, with others supplying auxiliary lights that have been found necessary as lamps and candlepower costs have been cheapened. It is often possible to show that such additions to the lighting equipment are hazardous and secure a contract for wiring that will give additional lights with luxury outlets.

Average Contract, $250

The average contract in territory thus far canvassed comes to about $250, providing about twenty outlets with fixtures. The average value of property is about $7,000, so that credit and collections involve practically no problems. Thus far, collections have been 100 per cent, and the very few contracts rejected have been in cases where a householder's equity in his property was not large enough to give the moderate security required.

Financing

All [illegible] financed through a finance company, the Contract Purchase Corporation, so that contractors and the selling organization have practically no capital tied up. This corporation's method of financing the instalment wiring of homes, as well as consumer purchase of the more costly appliances, is doubtless familiar now to electric men.

Briefly, six separate corporations cover the country, with headquarters in New York, Philadelphia, Cleveland, Chicago, Dallas and San Francisco. Having closed a wiring contract, the account is sold to the purchase corporation by the contractor for cash, at the full price for the job, the householder paying down a first installment that covers moderate interest. The contractor acts as collection agent for the purchase corporation, receiving a commission for that service when the last payment has been made.

Middle-Class Are Best Customers

The best customers for wiring are middle-class home owners—the busy, foresighted, thrifty-spending and neighborly people, "just folks," who appear to have been overlooked by the electrical contractor's salesmen because no way had been contrived to canvass them collectively. Once signed up, they are something better than good individual customers. The signature on the contract is hardly dry before they want the wiring job begun. The contractor agrees to start each job within ten days after credit has been approved, and to complete it within reasonable time. The householder is usually right on his heels, keenly interested in details. One of the difficulties that must be overcome by salesmen is the apprehension that wiring means several weeks' work and a torn-up house.

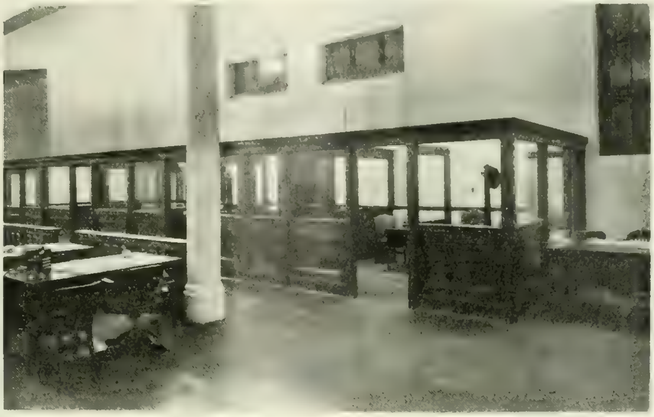
When work is begun, and the householder sees with his own eyes how conduit is run between partitions and floors, he is more than delighted. He becomes a volunteer salesman for modern wiring. He explains to the neighbors just how it is done, and talks about the "luxury outlets" and invites them in to see how convenient and up-to-date a wiring job can be. Thus, one contract leads to others, and the salesman and contractor usually benefit because the householder almost invariably advises neighbors to place their work with the same people—the salesman took such pains to see that the householder got the worth of his money in electrical service, and the contractor was so prompt and careful in doing the work, and so forth.

Demonstration of Possibilities

If it takes five years to cover a city like Newark, wiring only one house out of twenty in the first canvass, new business ought to gravitate constantly and automatically to the contractor who does satisfactory work. That one house in twenty becomes a demonstration of electric possibilities, and the householder is a self-appointed and well-disposed demonstrator working among his neighbors. As a matter of experience, even in the short time this campaign has been carried on, contractors have found enough people interested in wiring jobs to make up a list of live prospects for the sales force.

Mr. Harold B. Fisk, manager of the Walsh Plate & Structural Works of Drummondville, Que., was also elected secretary of the company for the ensuing year, at the Annual Meetng held on January 25th. Mr. Fisk was recently admitted an associate member of the Engineering Institute of Canada.

The contract for the erection of a building to be used by the Walkerville Hydro-electric System as offices and sales rooms, at Argyle Road and Wyandotte St., Walkerville, has been let to the Windsor Construction Co., Ltd.



Notice that the maximum of illumination is produced at the level of the desk surfaces. Within the private offices note the bright effect below with comparative darkness above. This all results from choosing proper units and spacing them properly at the correct heights.

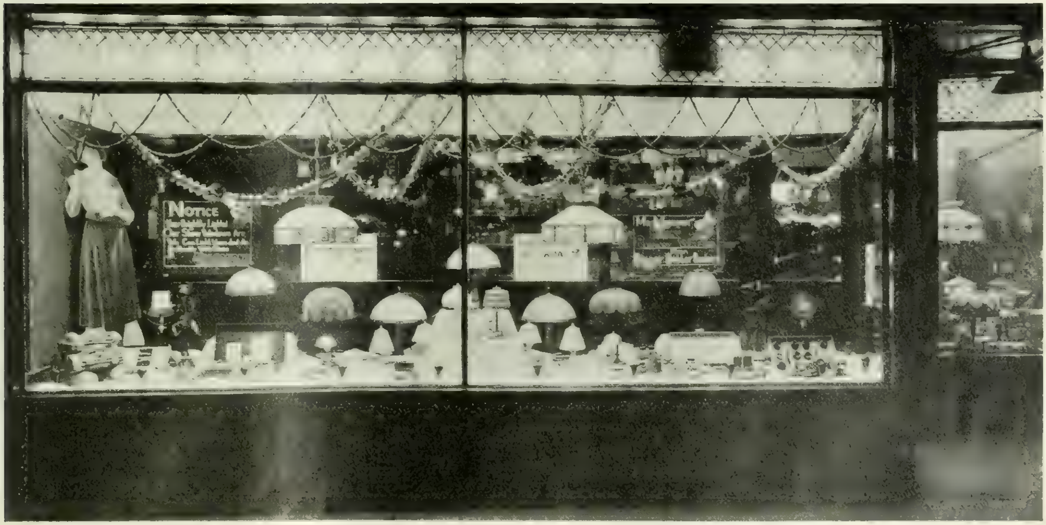
Two Illustrations of Good Lighting

If We Want to Be Efficient in Our Business We Must Have Proper Working Conditions

On this page we show two illustrations of pleasing and effective illumination. One is the interior of a bond house, recently fitted up. The desks and all woodwork shown are of dark finish and the photograph is taken without any auxiliary lighting. It is particularly noticeable that the maximum of illumination has been produced in the neighborhood of the desk tops. For example, looking into the private offices, one notices at once the higher illumination on the walls just above the desk than is apparent on the walls higher up. This result has been produced by proper choice, spacing and adjustment of the lighting units.

The other picture represents the store front of George Wilkinson, electrical merchant, Toronto. Note the detail with which everything in the window is portrayed. Mr. Wilkinson states that this window is proving of double value to him commercially. His appliances are selling very much more rapidly because they are well shown, and he is also doing a nice business in putting in lighting installations, similar to his own, for other merchants.

Both of these pictures represent results from Holophane equipment, in the skilful hands of Frank T. Groome. Mr. Groome is now devoting his entire time to illumination. It is a big field with possibilities for almost unlimited development. In a country where electric current is cheaper than anywhere else in the world, we have some of the most lamentable exhibitions of inadequate illumination. Work such as Mr. Groome is engaged in has a moral as well as a commercial side.



The store front of George Wilkinson. It has sold both appliances and lighting contracts

Suggestions for the Window Trimmer

Some time ago, there appeared in the Westinghouse "Contact" a number of suggestions for trimming windows. They seemed so complete that we felt our readers also would like to see them.

1. Keep your windows clean. Have them washed frequently. If your own employees haven't time, get outside help. It will pay.

2. Don't overcrowd your window.

3. Avoid the other extreme. Too little in a big window will cause the merchandise to be "lost".

4. Card holders are useful. They'll keep price cards from falling over on their faces.

5. Make your display attractive to the eye—and the purse—but don't make it so "pretty" the merchandise is forgotten in admiration of the "trimmings".

6. Make your store front reflect you. It is the exterior which most people see. Impressions are made by exteriors.

7. Put the emphasis on the goods, not on the decorations.

8. Use art only to create a desire to buy the goods displayed.

9. Be sure your window lighting is the best obtainable.

10. Have the backing of your window high enough to shut off the view of the store interior.

11. Use a dark color in the background when displaying light colored goods, and vice versa. Get contrast.

12. To express coolness in a winddow use gray, light green or light blue for the color scheme

13. To show warmth use reds, yellows, oranges—warm colors.

14. Dust out the window space frequently.

15. Never allow soiled or flyspecked cards or merchandise to remain on display.

16. To help the eye to travel quickly from a card to the object displayed, connect the two with white tape or ribbon. An arrow will have the same effect.

17. Invest a little money in stands on which to display your merchandise. It will pay.

18. Empty cigar boxes make good "building blocks" to erect most any size or shape foundation for a display.

Crepe paper, bunting and cheese cloth are inexpensive coverings and draperies.

20. Make your display fit the season.

21. Get ideas from merchants in other lines of business.

22. Plan your displays ahead—days and even weeks ahead.

23. Get all material ready for the new arrangement before the old display is taken out.

24. Keep a "window note book". Jot down in it ideas you see which you may use later.

May Electrify Planing Mill

Thurston-Flavelle, Ltd., manufacturers of cedar lumber at Port Moody, B. C., recently purchased a Goldie-McCulloch cross compound engine and direct connected generator from the electric light department of the city of Edmonton. This will be used to supply additional power for the new gang saw being installed by the lumber company. About 200 h.p. will be developed in the meantime, which will probably be added to in years to come if the company decides to electrify their planing mill, which they have considered doing, using group rather than individual motor drive.

New Books

Practical Electrical Engineering; Direct Currents; by Harry G Cisin, M. E., engineering editor "Electrical Record." D. Van Nostrand Company, New York, publishers. This book is described as "a manual for industrial and evening classes and for home study." The basic principles of direct-current electrical engineering are presented, simplicity being the keynote. The chapter headings will indicate the scope of the work:

1. Electricity and Magnetism; 2. Fundamental Laws of Electrical Engineering; 3. Electrical and Magnetic Circuits; 4. Electrical Instruments; 5. Direct Current Measurements; 6. Primary and Secondary (Storage) Cells; 7. The Electrical Generator; 8. The Direct-current Motor, with an appendix on laboratory experiments. 68 illustrations; 305 pages; size, 5 in. x 8 in.; stiff green cloth binding. Price $2.00.

Mechanical Trades, Ltd., 54 University Ave., Toronto, have secured the contract for electrical work on a warehouse to be erected for Barber-Ellis, Ltd., at 370-374 Adelaide St W., Toronto, at an estimated cost of $120,000.

[illegible] officials and members of Toronto staff in recent convention in Toronto Note the determination in every face to make **1922** the "best yet"

A "Pure Food" Cafeteria

Hamilton Can Boast the best Equipped Restaurant—Electrical Throughout

A "Pure Food" cafeteria which was opened recently at 52½ King Street E., Hamilton, is equipped with most modern kitchen and restaurant equipment. It goes without saying, therefore, that the kitchen equipment is electrical throughout. It consists of: one electric bake oven; one electric hotel range; one electric steam table; one electric hotel toaster & griddle; three electric urn heaters; and two electric water heaters.

The Oven

The electric bake oven, with three separate decks, each individually controlled by separate three-heat switches, has a capacity of twenty-five 1½ lb. loaves per bake. With this oven, one complete bake is possible every forty minutes when bread only is baked. When an assortment of bakery goods is handled, it is possible to show a daily output such as follows: 60 pies; 1 19-in. x 27-in. pudding; 40 meat pies; 150 rolls; 3 doz. tea biscuits; 6 doz. cookies; 1 pan macaroni; 1 pan spaghetti; 12 cakes ,and 50 lbs. meat.

As each compartment is individually controlled, it is possible to bake three different products in the different compartments at different temperatures, all at the one time.

The Range

The heavy duty range is of a capacity to take care of 300 fancy or a la carte meals at a sitting, and from 350 to 400 table d'hote meals at a sitting. This range is equipped with the latest development sheath wire units, which are specially built to withstand the heavy service of hotel and restaurant work.

Other Equipment

The electric steam table is equipped with units of 6 kw. capacity, which insures an even distribution of steam. The toaster is of 16-slice capacity and toasts both sides of the bread at one time. The top of the toaster is fitted with a special polished steel top, for the preparation of griddle cakes, etc. The electric urn heaters are equipped with 3-heat switches, and are used to heat the coffee urns installed. Hot water is supplied from a tank conveniently located in the main kitchen, the water being heated by two sheath wire water heaters, of a total capacity of 6 kw., which assures a continuous supply of hot water.

The total connected load of the electric kitchen equipment is 52½ kw. Power is supplied by the Cataract Power, Light and Traction, Ltd., Hamilton, who installed one 50 kw. transformer, and a 3-wire, 110-220 volt service of 4/0 cable.

All of the electric equipment was manufactured by the Canadian Edison Appliance Co., Ltd., Stratford, Ont. Mr. Sariotis, the owner of the cafeteria, is highly pleased and justly proud of his installation and the service he is now enabled to render. Cuts of the kitchen and self-serve dining room are shown herewith.

Kitchen with Electric Bake-oven, Heavy Duty Range, Water Heater and other equipment

The Electric Steam Table has units of 6 kw. capacity. The toater does 16 slices at once. Electric Urns shown in backgrown.

Laboratory Lightning Storms

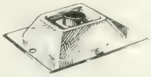
The General Electric Company have recently perfected, through the efforts of Dr. C. P. Steinmetz, an equipment for producing actual lightning in the laboratory. The practical value of this will be seen in the means that will thus be provided for testing lightning arresters, under what will amount to actual storm conditions. The voltages used do not constitute a record in any way—120,000 volts—, the necessary energy being produced by storing up capacity in a condenser consisting of 200 large glass plates. Dr. Steinmetz points out the essential difference between high voltage and lightning. Lightning is a high voltage coupled with a heavy amperage, the discharge lasting for a very short time and so giving explosive effect. In the lightning "generator" Dr. Steinmetz gets a discharge of 10,000 amperes at 120,000 volts, which means something over 1,000,000 h. p., but the length of time it lasts is only one hundred thousandth of a second. It is interesting to note, in this connection, that while we are far from producing the amount of power represented by a natural lightning flash, we are not so very far from equalling the voltage represented by it. Dr. Steinmetz represents the voltage of a lightning flash at around 50,000,000 volts. Recent laboratory experiments have developed apparatus that will produce 1,000,000.

Radio is Popular

That radio telephony is growing in popularity has been quite apparent for some time past. This fact was emphasized by speakers before the annual convention of the Electrical Supply Jobbers' Association, held at Atlantic City, N.J., who stated that manufacturers are unable to keep pace with the demand for apparatus and that "radio telephony is sweeping the country with a popularity that is a revelation."

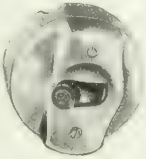
The Latest Developments in Electrical Equipment

[illegible] Bark Electric Manufacturing [illegible] 40-48 Easton Ave., St. Louis, Mo., have recently put the rectangular push button here illustrated on the market. This push button is made in either solid brass or copper, with a brush satin finish; contact parts are all spring brass. Damp or salty atmospheres do not corrode or damage it. The manufacturer states that while the design of this button is suitable for all types of houses, they find there is a particularly heavy demand for it by builders of the bungalow type of homes.



All-porcelain Tumbler Switch

The Canadian General Electric Company are marketing a new all-porcelian tumbler switch, as shown. This switch is specially designed for use in damp places, such as laundries, basements, factories, etc. The insulation afforded by the porcelain cover is, of course, superior to that of brass. Another interesting feature claimed for this switch is that it is the only all-porcelain tumbler switch made in the Dominion.

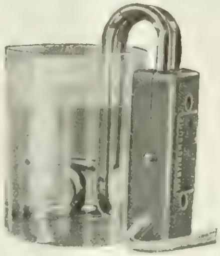


Short-handled Vacuum Brush

The O. K. Machine Co., Inc., Canfield Ave. & Poplar St., Fort Wayne, Ind., have placed the "O. K." Vacuum Brush on the market. This is a complete machine in itself—not an attachment—and is specially designed for cleaning upholstering, draperies, clothing, billiard tables, etc. and has been found almost indispensable in dry cleaning establishments. The brush is driven by a motor, controlled by a thumb operated switch on the motor case. The dust bag is placed inside the short handle and is quickly emptied by removing a metal cap on the rear of the handle and turning on the motor; a larger bag, which fastens over the end of the handle, may also be used. The machine is equipped with a universal motor and operates on 110 volts a. c. or d. c. The brush can be used with one hand as it weighs less than three pounds.

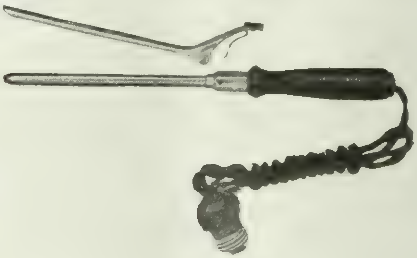
Tumbler Water Heater

The tumbler water heater, manufactured by the Westinghouse Company, is designed to heat a small quantity of water quickly and efficiently. The product is substantially and durably constructed, making it practical for heating any small quantity of liquid. The element is inserted in copper tubing bent to afford a large heating surface. It is nickel-plated and highly polished. The through-switch of black composition is extra large to provide a convenient rest as well as a practical switch for the heater. The voltage of the heaters ranges from 110 to 120 volts and the wattage is 350. The net weight is one pound. The heater has three distinctive features; in that it will not tip the tumbler over; it will not break the glass, and it will not burn or scorch the article on which it is laid. When it is placed in a glass of water, it rests on the base of the switch, thus preventing the weight of the heater from tipping the glass. The switch also affords a rest for the heater when it has been removed from the liquid. It will not break the glass because it does not come in contact with the glass. The danger of burning or scorching is eliminated by laying the tumbler heater so that the tubing extends in the air, thus making it impossible for the table upon which it is lying to be scorched or burned.



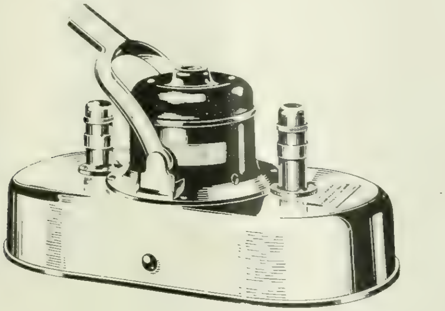
A Smaller Size Curler

The Northern Electric Company, 224 North Sheldon St., Chicago, Ill., manufacturers of electric heating appliances, are now manufacturing a smaller sized curling iron than their standard No. 55. This iron is 10½ inches by 5/16 inches and also has the removable clamp feature. The same company are manufacturing a 3-heat heating pad, 12 inches by 15 inches. Another popular product is the Midget toy flat iron, with a weight of 1½ lbs. and a consumption of only 27 watts. This is strictly a toy for children, but is nickel plated and well made; complete with cord and plug to use on standard current, "just like Mother's."



New Cleaning, Waxing and Polishing Machine for the Home

An entirely new idea in electrical equipment is announced in this issue of the Electrical News. It is an electric floor cleaner, waxer and polisher combined in one. This is not the first time, it is true, that floor polishers and waxers have been placed on the market, but up to the present time, none of them have proven entirely satisfactory. The new machine is claimed to cover the faults of all previous designs, and to have many added features. In short, it is a machine which the manufacturer claims has been fully tested out and will do all that is claimed for it, namely, it will clean our hardwood floors, then it will wax them and, finally, it will polish them—the whole operation being so simple, and the machine itself being so light and well balanced, that the operation may be conducted by a child.


It Cleans Waxes and Polishes

The main principle underlying the construction of this machine is the revolving disc, floating on its bearings in such a way that it adjusts itself to any little unevennesses in the floor. The machine is supplied with two discs, (either pad or brush, depending on the operation under way) belt-driven from the motor. In the initial operation, one of these discs would apply a cleansing material; the other disc following it would rub this material into the floors, absorbing and drying at the same time. These discs would then be replaced—the work of a few seconds, only—by a waxing pad and a distributing brush or, under certain circumstances, a polishing brush, or this latter operation may be deferred until later, when a coarse and fine polishing brush may be used together so as to leave the floors in the finest possible condition.

Mr J Skelton

Mr R N Connor

Another interesting feature about this new equipment is that it is manufactured in Canada, by the Canadian Floor Waxer & Polisher Co., Ltd., Toronto. Deliveries will be made from the middle of March. The two principals in this firm are Mr. J. Skelton and Mr. R. N. Connor, both already well known to the trade as Hoover enthusiasts. Mr. Skelton has been Toronto representative of the Hoover Suction Sweeper Company for twelve years and leaves them with the greatest regret and only because he is convinced that his new waxer and polisher will do all that is claimed for it and that he will thus be in a position to supply the public with an electric appliance for which there is a very urgent demand. Mr. Connor has also been with the Hoover company for many years. He is sales manager of the new organization. The headquarters of this company is at 666A Yonge Street.

Mr. Tufford Goes to Hamilton

Mr. A. A. Tufford succeeds Mr. J. A. Daly as manager of the Hamilton office of the Northern Electric Company, Mr. Daly, as recently announced, having been promoted to Regina. Mr. Tufford is a graduate in electrical engineering of the University of Toronto, obtaining his degree of Bachelor of Applied Science in 1917. Previous to graduation he had spent some time with the Canadian Westinghouse Company, Hamilton, and in the engineering department of the Hamilton Hydro-electric System. Following graduation he joined the Northern Electric, but in 1918 received a commission in the Canadian Engineers and went overseas. On his return the Northern Electric Company sent him to Vancouver, where he spent two years, returning to Toronto office in November last. Mr. Tufford took charge of the Hamilton office on February 15

Mr. A. A. Tufford

PROSPERITY IN KITCHENER

Be optimistic—there is plenty of money in Kitchener
Even the ducks have bills.
The frogs have green backs.
Automobiles wear Diamond tires.
In fact, you cannot raise a window but what
a draft blows in.
And you can cash in on every boost you give
The Twin City Electrical Exhibition
May 1st to 6th, 1922

Ventilation of Electric Sub-stations

By A.M. STEPHEN, A.S.H. & V.E.

Of Stephen & Boyle Ltd. Heating & Ventilating Engineers, Vancouver, B.C.

A peculiar and unique problem in ventilation is afforded by the electric power station. The excessive heat generated by the transformers, which in many cases are loaded to capacity or over, in combination with the temperature of the air on warm days, makes these buildings extremely unsanitary and oppressive for those working there. In some cases the machines are cooled by the use of blowers but there is always the objection that dust and dirt may thus be introduced. The more practical method would seem to involve the removal of the over-heated air at a sufficient rate, thus allowing for the supply of cooler, fresh air to take its place. Fans sufficiently powerful to handle this super-heated air at a rate sufficient to keep the air cool mean draughts dangerous to the health of the employees.

Ventilating New Westminster Station

At the B. C. Electric sub-station at New Westminster, B. C., a cut of which appears on this page, the problem of ventilation is solved by means of the Autoforce air pump, four of which are installed on the roof of the sub-station. Each of these machines has a definite displacement in cubic feet of air per minute, making it possible to have a complete change of air in the building every fifteen minutes. Their construction is such that there is no possibility of down-draft and besides making conditions more comfortable for the staff in charge, the generators and transformers are kept from overheating since the air is kept in motion and the surplus heat removed as soon as generated.

Another Pioneer Gone

Another pioneer in the electrical industry has passed away, in the person of Mr. A. A. Wright of Renfrew. Mr. Wright as president of the Renfrew Electric Company was also one of the earliest presidents of the Canadian Electrical Association. At one time he represented his constituency in Parliament. Locally, he was always spoken of as the town's most prominent citizen. Mr C. H. Wright, Halifax, Manager, of the Canadian General Electric Company is a son.

[illegible] will be installed at railway crossings in Tavistock, Ont., early this spring, by the Grand Trunk. Mr. W. J. Piggot, Stratford, Ont., will supervise the work.

Will Merchandise, Also

We are advised that The Western Quebec Power Co., Room 603, Drummond Building, Montreal, has the intention of adding merchandising to their activities as an accommodation to the many customers in the territory already covered by its system, which includes to-day about 15 municipalities. This latter figure is expected to be raised to 25 within a short time.

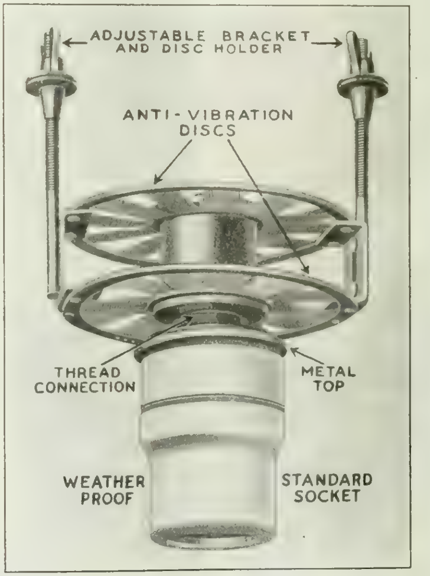
Mr F. D. Reaume, 1015 Wyandotte St. E., Windsor, has secured the contract for electrical work on a hotel building at Chatham & Ferry Sts., Windsor, that is being altered, to a newspaper plant, for the Windsor Telegram Company.

The Northern Electric Co., Ltd., 599 Henry Avenue, Winnipeg has been awarded the contract, by the city of Winnipeg, for a quantity of lead covered cable.

The Ontario Gazette announces that Letters Patent have been issued to a corporation to be known as The Monarch Battery Co., Ltd., capitalized at $40,000. Head office; Kingston, Ont.

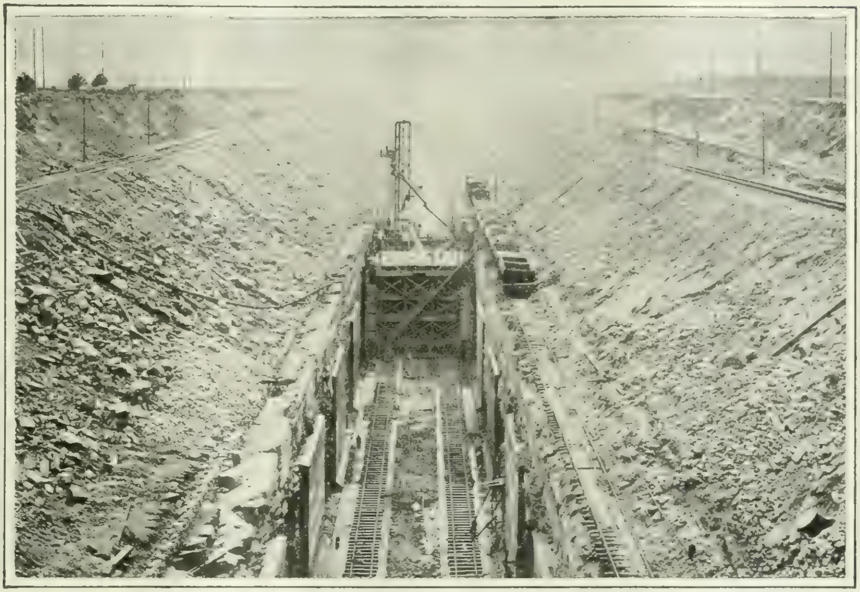
Fire losses in Canada during the week ending February 8, are estimated by the Monetary Times at $756,300, compared with $1,163,000 the previous week.

It is stated that Ottawa labor in building trades will be asked to accept a general cut of 10 cents an hour this year, although no agreements have been reached as yet.

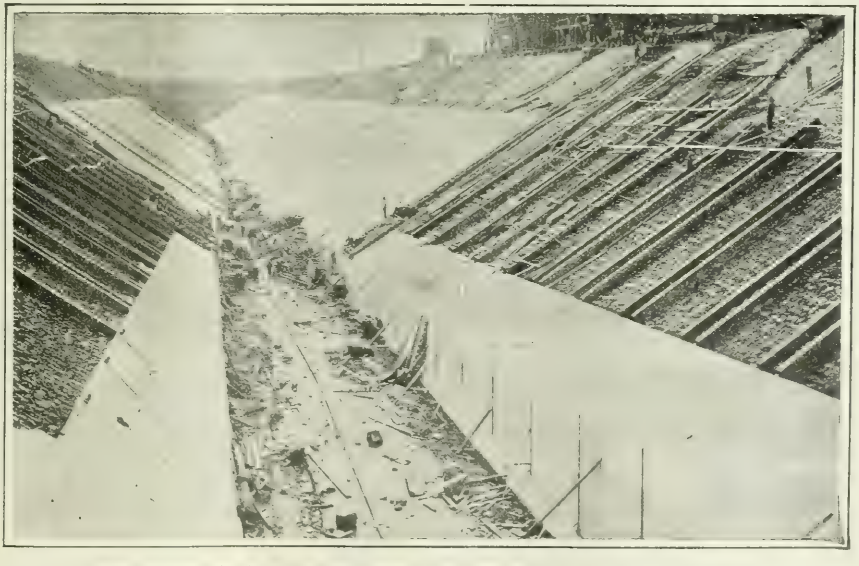


Anti-break Lamp Economizer being handled for an English manufacturer by Mr. Macaulay Pope, Toronto

Views during construction of Queenston-Chippawa Canal



view of concreting plant showing how the walls were built up in alternate sections



Placing concrete lining in the Whirlpool section of the canal showing various stages of construction

Current News and Notes

Campbellton, N. B.

The town council of Cambellton, N. B., are considering the placing of all electric light and telephone wires underground. Mr. H. G. V. Farrer is electrical engineer.

Edmonton, Alta.

By-laws will be submitted to the rate-payers of Edmonton, Alta., regarding the following expenditures: $250,000 for telephone exchange and equipment; electric light extensions $12,500; power plant extension $115,000.

Ft. William, Ont.

At a joint meeting of the Utilities Commissions of Pt. Arthur and Ft. William, Ont., recently, a resolution was passed favoring the use of one-man street cars in these cities. If the approval of the Railway Board is obtained it is understood about twenty cars, in each city, will be changed over for one-man operation.

Kitchener, Ont.

The Kitchener Board of Trade recently endorsed the proposal of the Waterloo & Wellington Street Railway Company to extend the company's line through to Guelph, via Bloomingdale and New Germany, providing such action is taken within two years' time. At present the line runs from Kitchener to Bridgeport.

London, Ont.

At the annual meeting of the London Street Railway Company, held recently in London, Ont., it was decided to approach the city council, at an early date, with a request for an increase in fares in order that needed improvements might be made. For the year 1921, the following figures apply: Gross earnings, $567,866.26, an increase of $43,137.96 over 1920; operating expenses,$487,344.13, an increase of $32,786.78 over 1920; wages, included in operating expenses for 1921, amounted to $351,476.24, an increase over the year 1920 of $22,542.92. The net earnings from operation amounted to $80,522.13, and after deducting fixed charges and depreciation, the net income for 1921 amounted to $11,512.90.

The Northern Electric Co., Ltd., at present located in the Home Bank Building, London, Ont., have leased larger quarters at 175 King St., London, which they are having remodelled and fitted up for offices and show rooms.

Montreal, Que.

Messrs. J. Ortiz & Co., 1395 Bordeaux St., Montreal, have been awarded the contract for electrical work on a store building recently erected at Masson & Chabot Sts., Montreal, for Mr. T. Lefebvre, 292 Clifton Avenue.

Mount Royal, Que.

Mr. H. H. Cassidy, 255 Regent St., Montreal, has been awarded the electrical contract on 24 residences to be erected early in the spring, at Mount Royal, by the Rockland Housing Co., at an estimated cost of $150,000.

Oakville, Ont.

Mr. F. Sullivan, Oakville, Ont., has been awarded the contract for electrical work on a service station recently erected on Dundas St., Oakville, Ont., by the White Rose Oil Company, of Toronto.

Ottawa, Ont.

The Canada Gazette announces the incorporation of the Brazilian Hydro-electric Company, Ltd., with a capitalization of $5,000,000; head office, Toronto. The new firm is authorized to carry on hydro-electric developments throughout the Dominion.

Officials of the Hydro-electric System, Ottawa, Ont., are having plans prepared for a sub-station, which they propose to build this spring in the south part of the city, the cost of which is estimated to be in the neighborhood of $200,000.

That the Ottawa Hydro-electric Commission passed through a most successful and profitable year in 1921 is indicated by the annual statement and balance sheet submitted by J. A. Ellis, chairman of the commission, which shows a gross surplus for the year of $$61,791.96, after deducting all charges for maintenance and operation, power, interest, and sinking fund on $700,000 debentures. The operating report shows a revenue for the year of $328,108.97.

Palmerston, Ont.

The Library Board, Palmerston, Ont., are contemplating a complete new installation of electric wiring and lighting fixtures in the public library at that place and are asking for prices.

Quebec City, Que.

The Quebec Railway, Light, Heat & Power Company, Quebec City, recently received five of the ten new double truck cars ordered some time ago. These cars will be placed in commission in the very near future.

St. Thomas, Ont.

The city council of St. Thomas, Ont., propose an expenditure of about $25,000 in hydro improvements and have asked for the approval of the Railway Commission. It is planned to enlarge the Wilson Avenue sub-station and install a new transformer; also to install a number of transformers at other points.

Stratford. Ont.

The Stratford Public Utilities Commission have opened new showrooms and offices on Ontario St., Stratford, Ont. Mr. R. H. Myers is manager of the Public Utilities Commission, and Mr. E. W. Tobin is manager of the Hydro Shop, which also includes a staff of three salesmen.

Toronto, Ont.

The Canada Electric Co., 175 King St. E., Toronto, has secured the contract for electrical work on an office building to be erected at Bay & Temperance Sts., Toronto, for the General Accident Assurance Company of Canada, Ltd., Continental Life Building, Toronto. It is estimated that the cost of this building will be in the neighborhood of $500,000.

Messrs. Douglas Bros., 2137 Yonge St., Toronto, have secured the contract for electrical work on a tabernacle being erected on Christie St., near Bloor, Toronto, for the Christian & Missionary Alliance.

Messrs. Taylor Bros., 25½ Norwood Ave., Toronto, have been awarded the contract for electrical work on a store building being erected at Danforth and Westlake Avenues, Toronto, for the Wickham Hardware Co., 2424 Danforth Ave., at an estimated cost of $18,000.

Messrs. Nichol & Fagen, 111 Logan Avenue, Toronto, have secured the contract for electrical work on four residences being erected at Balfour Ave. near Dawes Road, and Barrington Ave. & Colemen St., Toronto, by Mr. T. A. Lewis, 77 Balfour Ave.

Vancouver, B. C.

Mr. J. C. Reston, 411 Howe St., Vancouver, has been awarded the contract for electrical work on an addition and alterations being made to the factory and store building of Jas. Reid, 559 Granville St., Vancouver, at an estimated cost of $25,000

Electrical News
Generation, Transmission and Application of Electricity

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Standard Rules and Regulations Governing All Canada

Little by little, with gradually improving organization, the electrical industry is functioning to remove obstacles that for a long time have barred the road to real economic progress. The lost motion due to overlapping, misunderstandings, and failure to grasp the situation as a whole, is being saved by closer working arrangements between central stations, manufacturers, contractors and merchants, who all now realize much more fully than formerly that their operations are interdependent and that success to any one section of the industry in impossible without the success of all.

There is one item, however, in which we are still carrying on in a woefully inefficient manner. It is in the matter of standard rules and regulations regarding electrical equipment and its installation. The province of Ontario is governed by a code drawn up and administered by the Hydro-electric Power Commission; the province of Quebec operates under a very similar code of the National Board of Fire Underwriters. We are frequently told, however, that outside of the larger cities this Code is more or less a dead letter on account of the lack of proper inspection. The western provinces, in many cases, have no inspection; in the larger centres the matter of specifications is left largely with individual inspectors, whose ideas vary, naturally, as to the essential standard. Some of them are unduly lax, others over-severe, with a large section of the country inadequately controlled. This works particularhardship to the manufacturer and increases the cost of electrical equipment to the consumer. It also means that poorly constructed equipment, hazardous alike to property and life, is frequently distributed in these districts.

Why not have standard rules and regulations for all Canada? Generally speaking, a device that is suitable and safe for use in the province of Quebec is suitable and safe for use in the province of Manitoba or British Columbia. Minor changes might be necessary to suit very special local conditions, but the exceptions could be minimized. What we seem to need is a recognized authority of some kind that meets with the approval of the various provinces and has the Government sanction in each province.

This matter is brought to the attention of our readers with the object of creating discussion out of which a solution of this weakness in our economic machinery may be crystalized. We shall be glad to have comments for publication from men who can speak with knowledge of the situation in different districts throughout Canada. The question, of course, is not a new one. It has had the attention of the Canadian Engineering Standards Association, and has been discussed by the two central station organizations, as well as by the Manufacturers', Jobbers', Contractor-dealers' and other electrical associations, all over Canada. There doesn't seem to be any doubt that electrical men are uniformly aware of this problem and the need of its early solution. Let us discuss the best way to handle it and get the thing done promptly.

First Canadian Electrical Council Meeting

In our issue of February 15 we outlined the formation, in Montreal, of the Canadian Electrical Council, composed of representatives of the Canadian Electrical Association, the Association of Municipal Electrical Utilities and the Canadian Electrical Supply Manufacturers' Association. The first meeting of this council was held as scheduled, in Toronto, on Monday ,March 13. Messrs. A. A. Dion, J. B. Woodyatt, A. P. Doddridge and L. W. Pratt represented the private companies; M. J. McHenry, E. V. Buchanan, O. H. Scott and P. B. Yates represented the A.M.E.U.; F. Jno. Bell, J. Herbert Hall and Geo. F. Foote the manufacturers. Messrs. Eugene Vinet, J. A. McKay and Walter Carr were also present.

The proceedings consisted chiefly of discussions on various points of common interest that were brought up by one or another of the delegates. These discussions included such important matters as a standard Code, for all Canada, covering the manufacture and installation of electrical equipment. At the present time there exist the greatest possible irregularities in this connection, which works a very real hardship on the industries — more particularly to the manufacturers and jobbers; Ontario follows a Code of the Hydro-electric Power Commission; Quebec, the National Code; the other provinces leave the matter largely in the hands of individuals, who are vested with authority to use their own judgment in the matter of what they shall require locally. The matter of Dominion standardization was advanced a stage and will have the further attention of the Council, which will work to the end of bringing the different provinces into touch and agreement with one another.

Other matters touched upon included the question of a joint convention of the C.E.A. and the A.M.E.U.; standardizing of transformer oil, attachment plugs, range elements, etc., and on a number of these topics recommendations were made to the parent organizations.

Two permanent committees were appointed. the first composed of Messrs. Julian C. Smith, M. J. McHenry, A. A. Dion and O. H. Scott, whose function it will be to consider matters of common interest between the C.E.A. and the A.M.E.U. A second committee, composed of L. W. Pratt, for the C.E.A., P. B. Yates, for the A.M.E.U., and Geo. F. Foote, for the manufacturers, will consider the question and advisability of adding to the membership of the Council any other organizations with Dominion-wide affiliation. It will also devolve upon this committee to encourage Dominion-wide organization of different groups, where such does not exist already.

J. A. McKay, the secretary of the Canadian Electrical Supply Manufacturers', the Canadian Electrical Supply Jobbers', and the Ontario Electrical Contractors' Associations, was appointed secretary of the Council. Walter Carr was appointed temporary chairman. The address of the secretary is 24 Adelaide Street West, Toronto.

The Luminaire

The coming into vogue of appliances which can be removed from place to place and to which the misnomer "movable fixtures" has been attached has brought the matter particularly to the attention of the lighting people. The Illuminating Engineering Society referred the consideration of this question to its Committee on Nomenclature and Standards with the suggestion that a term be recommended. Requests for suggestions of suitable terms were sent out to the membership of the Society and a considerable number of such suggestions were received. It was found, however, that most of the terms suggested were manufactured or coined words which had no legitimate ancestry and were therefore objectionable. Amongst the terms proposed, however, was one which met with the approval of the Committee, namely the word "luminaire." This word is used in this connection in the French language. Its construction and ancestry are such that it can be adopted in the English language as readily as "garage," "hangar," et cetera, which have recently been taken in. The significance of the word is evident on the face of it. It is believed that this word could and should be introduced into the English language and that it would be a distinct advantage so to do.

The Committee on Nomenclature and Standards recommended the use of this generic term for "lighting unit" in its report as presented to the annual convention of the Society at Rochester last September.

The Council of the Illuminating Engineering Society at the March meeting formally approved and adopted the use of the word "luminaire."

An expression of opinion favorable to the adoption of this term has been received from Engineering Societies and other organizations, and the term has already been adopted by the National Council of Lighting Fixture Manufacturers.

C. E. R. A. Convention in Quebec Jan 1, 2, 3

Preparations are in full swing for the annual meeting and convention of the Canadian Electric Railway Association, to be held in Quebec on June 1, 2 and 3. Most of the associate members have agreed to put on exhibits of specialties and arrangements have been completed for the drill hall for both the exhibits and meetings. The drill hall is about five minutes walk from the Chateau Frontenac, and there will be ample space for 25 or 30 first class exhibits. Every indication points to a convention which will exceed those of previous years in interest and attendance.

All the space for the exhibit, and the general decorations, are donated by the association. Exhibitors desiring to display a moving exhibit will also be supplied with alternating current in their booths. This convention inaugurates the exhibit idea and it is expected that with this added attraction the attendance will be the largest Canadian electric railway operators have had. The Exhibit Committee have made arrangements to take care of shipments arriving in advance of the convention, so that exhibitors will do well to lay their plans early in order to avoid possible delay.

We are advised that the membership of the Association, to which municipal enterprises are now eligible, has been greatly increased during the past year. This will add not only to the attendance at the convention but also to its value, in the wider exchange of ideas and experiences.

Wireless and Carrier Wave Telephony

An open meeting of the Toronto Section of the American Institute of Electrical Engineers was held on March 10 in the assembly room of the Canadian General Electric building, on Wallace Avenue, Toronto. The ladies had been invited and the attendance was one of the largest in the history of the Section, approximately 500 being present. Mr. W. P. Dobson, chairman of the Section, presided, and Charles A. Culver, Ph.D., addressed the meeting on the subject "Wireless and Carrier Wave Telephony."

Dr. Culver outlined the development of communication without wires from its inception, and introduced present day wireless by giving a few of the fundamental definitions. He then showed the principal methods of generating the high frequency voltages used as carriers. The matter of resonance was demonstrated by means of pendulums of different lengths, and its application to the electric circuit shown by analogy. The necessity of close "tuning" for the reception of the carrier waves was thus brought out, and the principle of "beat notes" explained. The speaker then followed up the development of the audion in its different forms and explained the variety of uses to which it was applicable in wireless work.

During the lecture, a loud speaking set was connected in, and the speaker frequently interrupted his discourse while parts of the programmes from broadcasting stations were received. At the close of the talk, the 10 o'clock time signals were received from Washington. After the technical session, light refreshments were served, and those present given an opportunity to meet socially.

The annual convention — the thirty-second— of the Canadian Electrical Association will be held this year in Ottawa, Chateau Laurier, June 15-16-17.

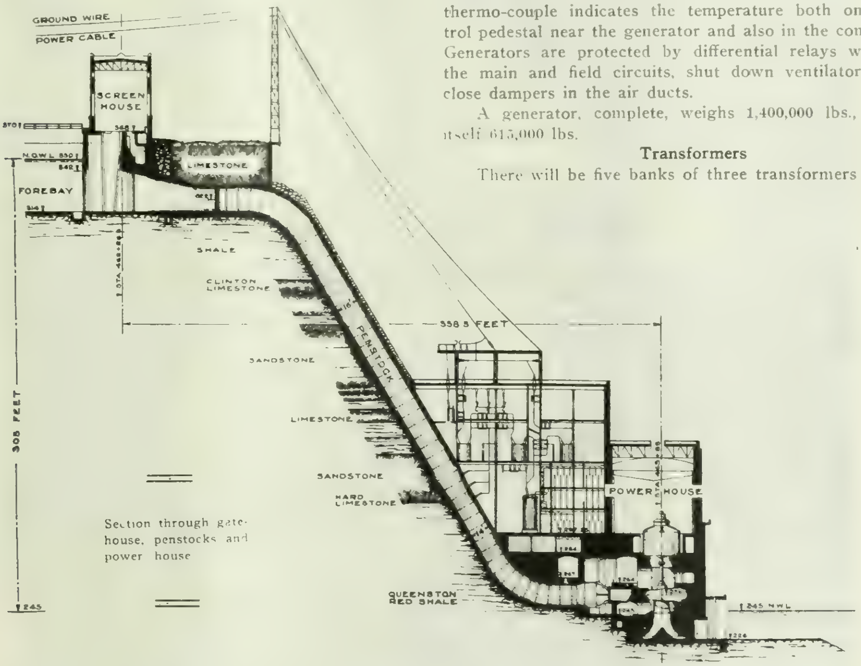
The Shawinigan Water & Power Company, Montreal, will increase their capital from $20,000,000 to $40,000,000. A bill authorizing this increase has been passed through the Legislative Council Committeee of the Province of Quebec.

The New Brunswick Electric Power Commission have issued the second annual report, for the year ended October 31, 1921. In this report it is stated that New Brunswick possesses undeveloped water powers with a continuous capacity of over 200,000 h.p., provided storage facilities are developed. With the exception of Grand Falls, of approximately 90,000 h.p., the different water powers vary from 1,000 to 10,000 h.p., but they are well distributed over the province.

First 50,000 h.p. Unit of Chippawa-Queenston Power Scheme—IV.

The Design of the Power Plant and the Specifications and Installation of the Major Apparatus

The present article, which is the fourth of a series on the Chippawa-Queenston power development of the Hydro-electric Power Commission of Ontario, deals, in a general way, with the electrical design and equipment in the power-house, which is located on the bank of the Niagara River, near Queenston. The first unit was placed in operation, officially, on December 28, 1921; a second unit commenced operation during the second week in March. Each of these units has a capacity of 45,000 kv.a. and generates power at 12,000 volts, 3 phase, 25 cycle, which, in turn, is transformed to 110,000 volts for transmission. During the present year it is expected that five units of this capacity will be installed and, ultimately, the plant will consist of nine or ten units. The subsequent units will in all probability have greater capacity than those being installed at present. The two units now in service are already developing in the neighborhood of 110,000 h.p., which is being delivered to the existing 110,000 volt system at Niagara Falls for transmission to various points throughout southwestern Ontario.



Section through gate-house, penstocks and power house

The generator type is vertical, with direct connected exciter. Each unit will be capable of operating continuously at 49,500 kv.a., with either voltage or current 10 per cent in excess of the rated value. At 80 per cent power factor the over-all efficiency of the generators will be slightly in excess of 97 per cent.

The thrust bearing is designed to support a load of 1,000,000 lbs. This is slightly in excess of the weight of the rotating part of the machine, plus the hydraulic thrust impressed by the turbine.

Generators Air-cooled

The generators are air-cooled, the quantity of air utilized being 120,000 cu ft. per minute. Air is drawn either from the outside of the building or from the generator room, or from both, and may be discharged either into the atmosphere or through ducts into the different sections of the building, for heating purposes. With five units operating, the heat available from this source will be the equivalent of 1.2 kw. per 1,000 cu. ft. of building content—an amount sufficient for heating the building in the coldest temperatures.

According to ratings, the maximum observable temperature which any portion of the units may attain, as indicated by thermo-couples, will not be in excess of 105 degrees Centigrade, with 40 degrees Centigrade ambient air. Each thermo-couple indicates the temperature both on the control pedestal near the generator and also in the control room. Generators are protected by differential relays which open the main and field circuits, shut down ventilator fans and close dampers in the air ducts.

A generator, complete, weighs 1,400,000 lbs., the rotor itself 615,000 lbs.

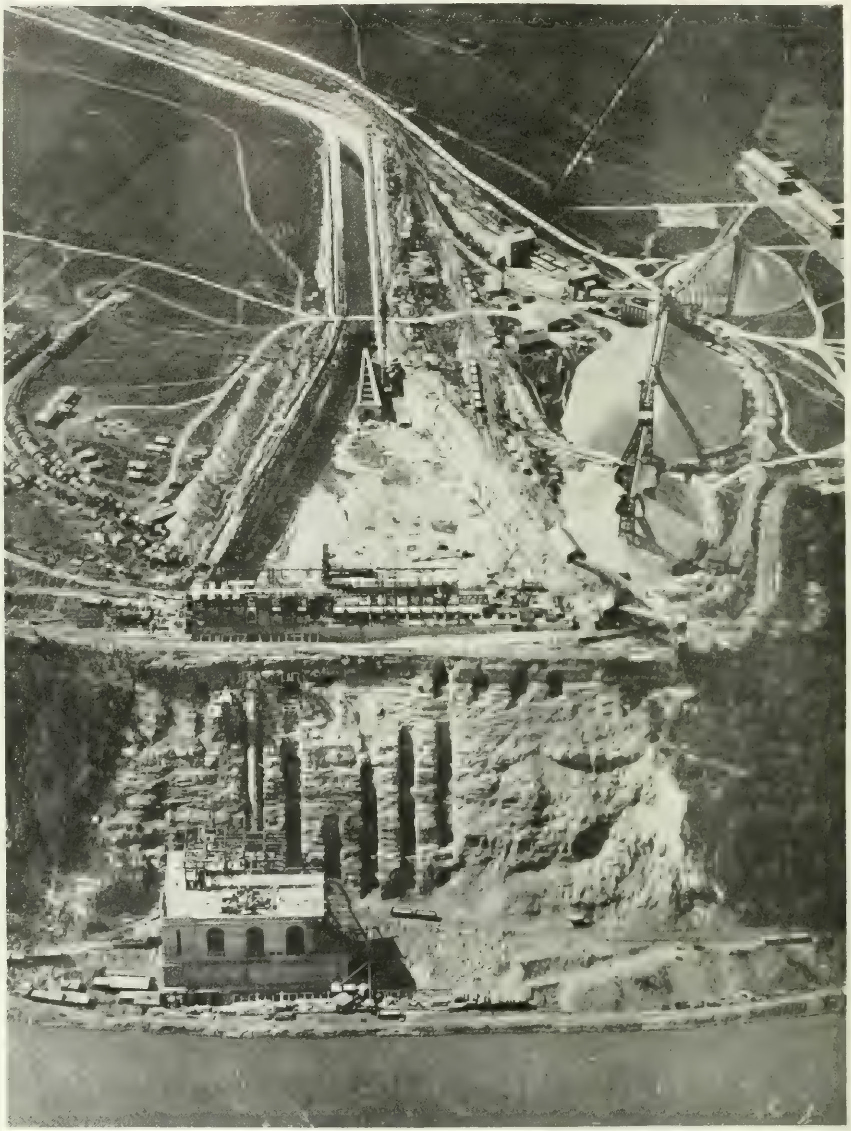
Transformers

There will be five banks of three transformers connected delta to "Y" to give 110,000 to 132,000 volts, at rated load. These are of the shell type, and individually rated at 15,000 kv.a., 25 cycle, 12,000/63,500/75,000. They are guaranteed 98.2 per cent efficient at 80 per cent power factor. The weight of a complete transformer is 100 tons; this includes 6,500 Imperial gallons of oil, which is required with each transformer for cooling purposes. The transformer dimensions are 28.5 ft. high, 9.5 ft. diameter. Each bank is equipped with differential protection.

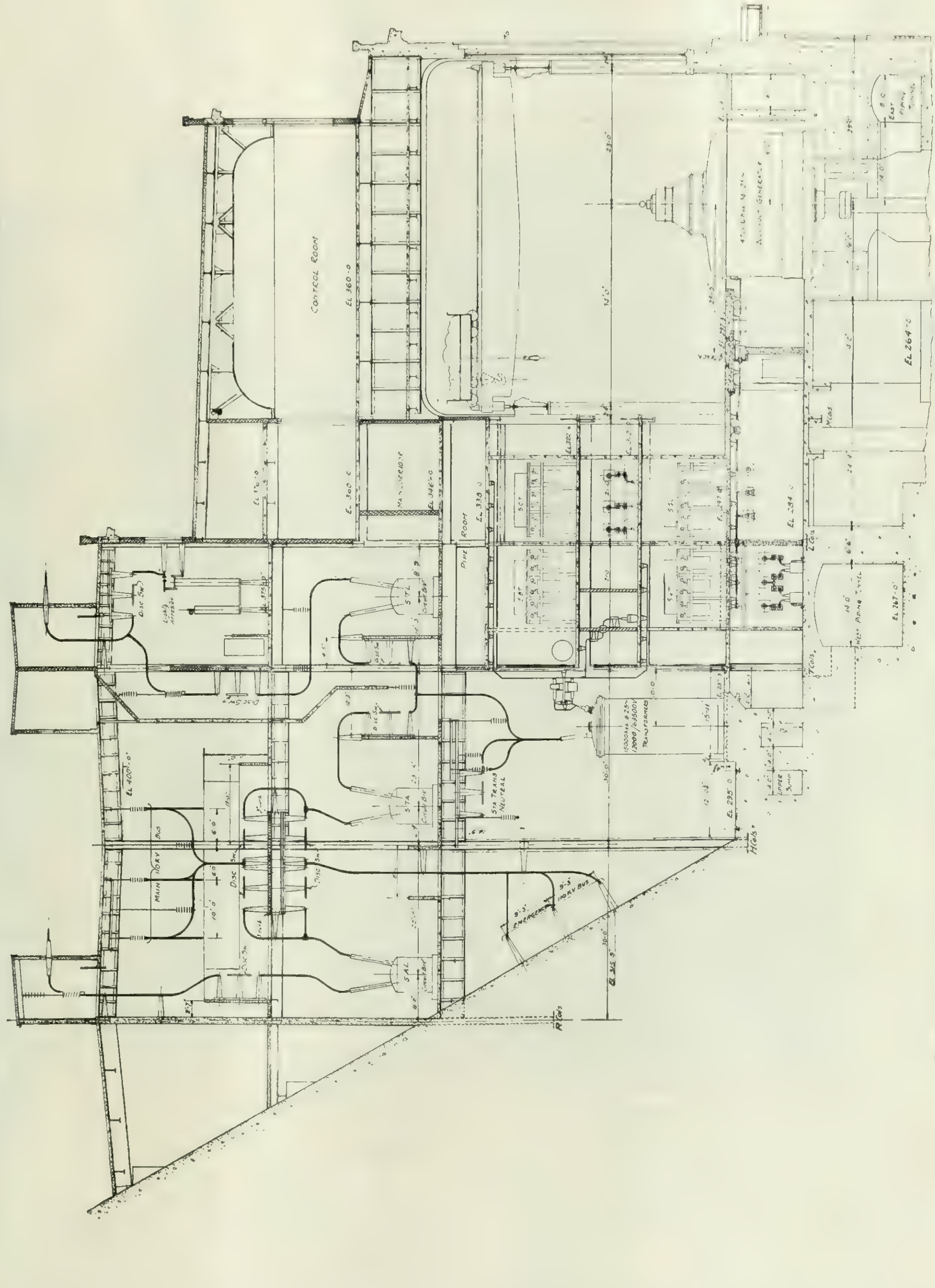
Switching Apparatus

The switching apparatus consists of 12,000 and 110,000

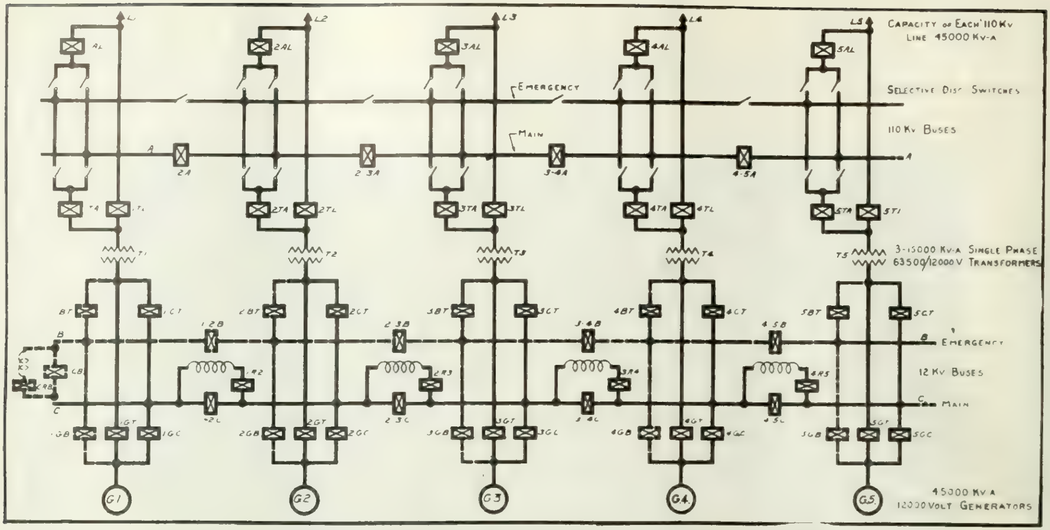
Airplane View of Queenston-Chippawa Plant



A wonderfully realistic Bird's-eye view of the Chippawa-Queenston development of the Hydro-Electric Power Commission of Ontario showing Canal, diffuser, forebay, gatehouse, penstocks, powerhouse and Niagara River.



Cross section of power house showing layout of electrical equipment Queenston plant, Hydro-electric Power Commission of Ontario


L1
L2
L3
L4
L5
Capacity of Each 110 Kv Line 45000 Kv-a
Selective Disc Switches
Emergency
Main
110 Kv Buses
A
2A
2-3A
3-4A
4-5A
T1
T2
T3
T4
T5
3-15000 Kv-a Single Phase 63500/12000 V Transformers
B
Emergency
12 Kv Buses
C
Main
G1
G2
G3
G4
G5
45000 Kv-a 12000 Volt Generators

Wiring Diagram Queenston Power House—Hydro-electric Power Commission of Ontario

volt oil circuit breakers and disconnecting switches. Both high and low voltage breakers have rupturing capacities of the order of 1500 MV.A.—considerably greater than anything of the kind previously produced in Canada. One of the 12,000 volt breakers already installed measures 36 inches in diameter and has been tested to 500 lbs. per square inch. The high voltage tanks are 6 feet in diameter, 14.5 ft. high and have been tested to 250 lbs. per square inch; this breaker is 25 ft. in height over all.

The 12,000 volt disconnecting switches are mechanically operated. They are rated at 3,000 amperes and are so arranged that the three switches forming a group operate simultaneously. The 110,000 volt disconnecting switches are of the three insulator type, with centre insulator rotating; they are rated at 600 amperes. The supports for the high voltage disconnecting switches are either standard suspension insulator or 42 inch corrugated posts.

Service Equipment

Service power is obtained from two generators, having a capacity of 2200 kv.a. at 2300 volts, 25 cycles, 500 r.p.m. An auxiliary 12,000 volt line also connects the Ontario Power Company. Motors of 25 h.p. or larger operate at 2200 volts; smaller 3 phase motors are 550 volts. The power house is provided with two main cranes having a capacity of 150 tons each, so that the combined service of the two cranes is required to handle a main generator rotor.

The location of the main generator room floor is an innovation in this plant. This is placed just a little below the top of the generator frame. This construction provides space for the exhaust ducts, fans and field equipment adjacent to the unit, on the lower floor, and still provides a clear space around the generator on the main floor.

The main leads from the generator leave near the top and are carried to the switching equipment in the form of bus construction. The heavy capacity single unit bus supports are used for all leads, which consists of three 4 x ¼ copper bars. The supports are spaced at a distance not exceeding 5 feet.

The main units are spaced 50 ft. centres, and all equipment involved in each unit—transformers, oil switches, reactors, fans, etc.—are located in the corresponding 50 ft. parallel space, each piece of equipment being symmetrically located within this unit space in regard to corresponding equipment of other units.

Each 12,000 volt oil circuit breaker is located in a room by itself, as are also the disconnecting switches belonging to each oil switch. The main 12,000 volt bus is mounted on a floor, the phase spacing being 4 feet. In no case are the connections spaced closer than 3′ 1″ centres.

The 110,000 volt (arranged for 132,000 volts) wiring is spaced 8 ft. between phases and 4 ft. to ground.

The control room will be located over the centre section of the generator room. This portion of the building is not yet constructed, so it has been necessary to provide a temporary control room in the service section. The permanent equipment is now being developed. This will embody some improvements which have developed as the result of operating the temporary boards. The control room will be arranged in units also, so that bench, instrument, relay and recording boards for each unit will be symmetrically arranged.

All control instruments and relay circuits will run to the control room. For each unit there are 56 such cables each with an average of 6 conductors; total length of conductor per unit is about 11 miles.

These cables are all carried in conduit to the cable gallery within the unit space for the unit, thence are grouped and carried in specially designed pans longitudinally to control room. The location of the cable gallery is such that the run of each cable is direct, i.e. there is no doubling back on itself of any cable; consequently the total length of cables should be a minimum. As the total length of control relay and instrument conductor for the complete plant, without the emergency 12,000 volt bus, is in excess of 120 miles, one appreciates the necessity of selecting the proper location for this gallery and the establishment of direct runs

Arrangement of Apparatus

The main wiring diagram, herewith, shows the arrangement of the main electrical apparatus. A generator, bank of transformers and a line is considered a "unit," each with a normal capacity of 45,000 kv.a. As it will be impracticable to dispose of the power in blocks of this capacity, grouping of units will be essential. For this purpose both 12,000 and 110,000 volt buses are provided. The diagram shows a double 12,000 volt bus, only one of which, however—that with reactors—is being installed, but space is being provided for the second or emergency bus, which may be installed later if conditions warrant.

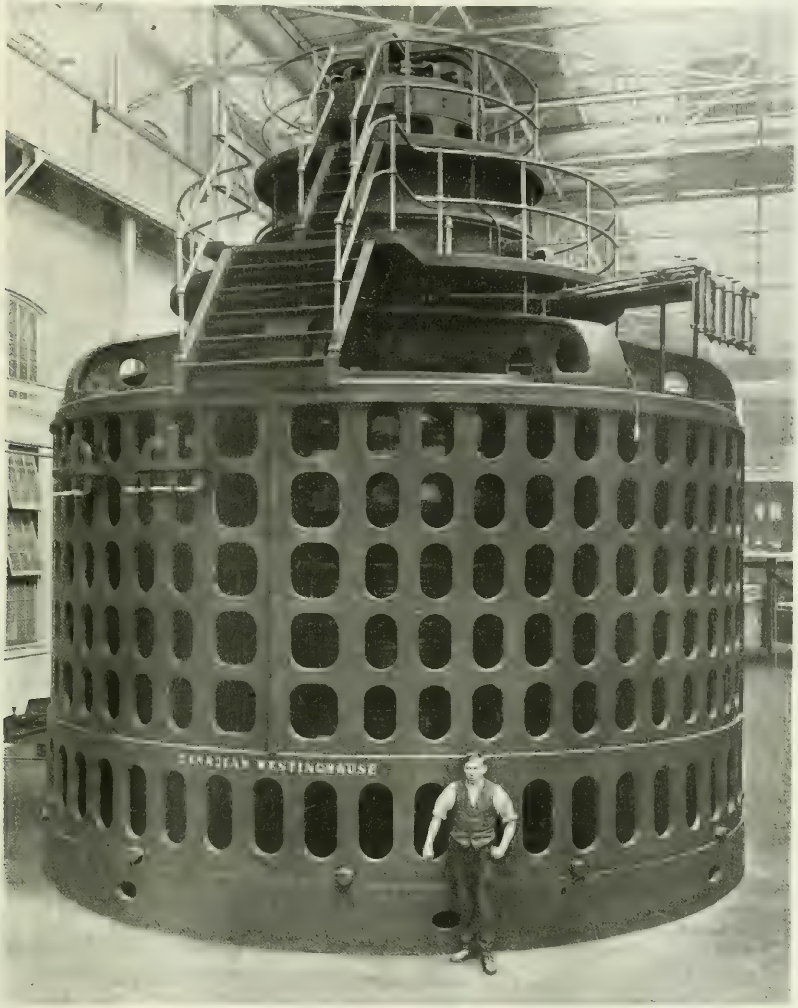


Fig. 1—First 45,000 Kv.a. Unit (Westinghouse in Queenston Plant of Hydro-electric Power Commission of Ontario

The remainder of this article will deal more specifically with the major apparatus included in the installation of Unit No. 1, which has been operating successfully for some months. The generator was supplied by the Canadian Westinghouse Company, Ltd., of Hamilton, Ont., and has a capacity of 45,000 kv.a. (55,000 h.p.) Generated current is 3 phase, 25 cycle, 12,000 volts, alternating. The generator is coupled directly to a 55,000 h.p. Wellman-Seaver-Morgan water turbine. While this generator is only one of a number of units of equivalent output being installed in the same station, it has the distinction of being the largest of its kind in operation at the present time, not only in Canada but in the whole world.

The generator to which reference has been made above is of the vertical type with direct connected exciter which is mounted above the generator, as will be seen from the illustration (Fig. 1) herewith. The driving turbine is directly underneath the generator. Between the generator and exciter is located the thrust bearing which carries not only the weight of the complete rotating element, but also that due to the water thrust on the turbine. The guide bearings at the upper and lower ends of the generator maintain a uniform clearance (or air gap) between the rotating and stationary parts.

Stationary Part

The stationary part, or stator, of the generator comprises a number of integral parts each bearing a definite relationship to the others. Of these parts the frame is one of the most important since it carries, directly or indirectly, all the other parts.

The frame is in the form of a webbed annular ring and is made of cast iron. By reference to Fig. 1, it will be seen that in the outer part there are numerous openings which serve as outlets for the air forced through the generator for cooling purposes. Inside, there are heavy axial or cross ribs, the inner surfaces of which are machined and have dovetail slots for holding the armature punchings cut in them. The cross ribs are braced by circumferential ribs uniformly spaced along the cross ribs. Due to the large size of the frame for this machine, it was found advantageous to divide it into a number of parts arranged for bolting together to form the complete unit. By the first division, a lower and an upper frame are provided. The lower frame rests on the bedplate and carries the lower bearing bracket with the lower guide bearing. This part of the frame is divided radially into two equal parts. The upper frame is supported by the lower frame and holds in it the armature core and windings while on top it carries the upper bearing bracket which in turn supports the exciter, the upper guide bearing and the thrust bearing. This part of the frame is divided radially into four equal parts, the joints being made in the centres of cross ribs to facilitate belting the sections together. Some conception as to the magnitude of this frame may be had from the fact that the approximate dimensions of each section of the upper frame are 10 feet in height and 19 feet in length, while the weight of each section is 42,000 pounds approximately.

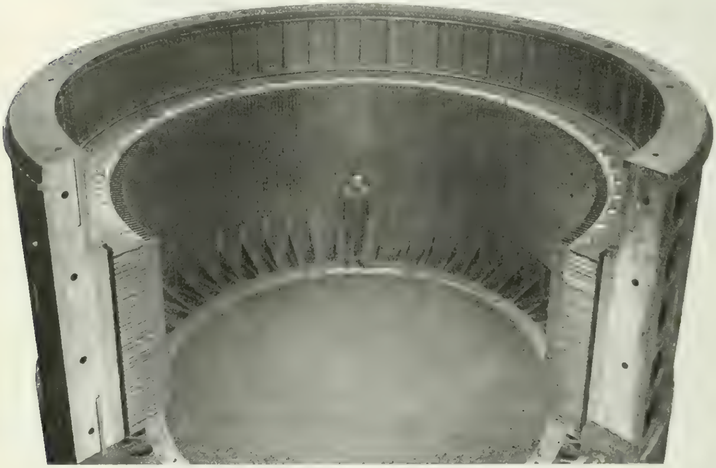


Fig 2—Internal view of Armature Core of first 45.000 kv.a. generator with one quarter section removed—Queenston Plant Hydro-electric Power Commission of Ontario.

The armature core is built up of thin sheet steel laminations which are punched to exact size. Due to the large diameter of this machine segmental punchings are used, having, on the outside, dovetails for holding them in place in the frame, while on the inside are the slot openings into which the armature coils are inserted. After being punched to size and before being assembled in the frame, these segmental punchings are annealed and enameled, a coating of enamel being put on both sides of each punching. In building the armature core from these punchings, vent ducts spaced about 2 inches apart, are put in between the layers and extend all around the core. The punchings after being stacked in the frame, are drawn tightly together under pressure and held firmly by means of heavy cast iron end plates which are keyed to the frame, in addition to being braced by heavy bolts which extend from one end plate through the punchings to the other end plate. These through bolts are insulated from the punchings. Fig. 2 illustrates the assembly of the frame and armature core, one quarter section being removed.

The armature winding of this generator consists of a large number of coils formed to shape and thoroughly insulated for insertion into the slots in the core. Bare copper strap rectangular in section, is used in making the coils, there being a number of straps used to make up each conductor. After the coils are formed to shape, the individual straps and also the groups of straps forming the conductors are insulated from each other by taping overall with mica tape. In insulating the complete coils micarta folium insulation comprising a process patented by the Westinghouse company is used. This insulation consists almost entirely of mica and in applying it to the coils precautions are taken to see that the layers are drawn tightly together in order to eliminate air spaces between the layers. The result is an insulation which is not only very compact, but also one which has a high dielectric strength. It will readily conduct heat away from the coils and at the same time will withstand high temperatures without deterioration, thus giving an insulation which is practically indestructible under all conditions of operation. One of the armature coils completely insulated in this way is illustrated in Fig. 3.

Slot cells are used to protect the surface of the insulation from the iron and at the same time they serve as wedges to make the coils fit tightly in the slots. The coils are retained in the slots by fibre wedges fitting into grooves in the side of the slots. The ends of the armature coils are braced similarly to those of turbo-generators. There are cast iron coil supports bolted to the end plates and to these the coil ends are fastened by means of wooden blocks placed under, between and above the coils. Insulated bolts extending through the openings in the ends of the coils to the iron coil supports hold the wooden blocks rigidly in place.

The connections between the various parts of the winding are made of insulated copper straps carried on supports above the upper ends of the coils. The windings are arranged for star connection and both ends of each phase winding are brought out through the frame in order that protective relays may be inserted in each circuit, while between coils

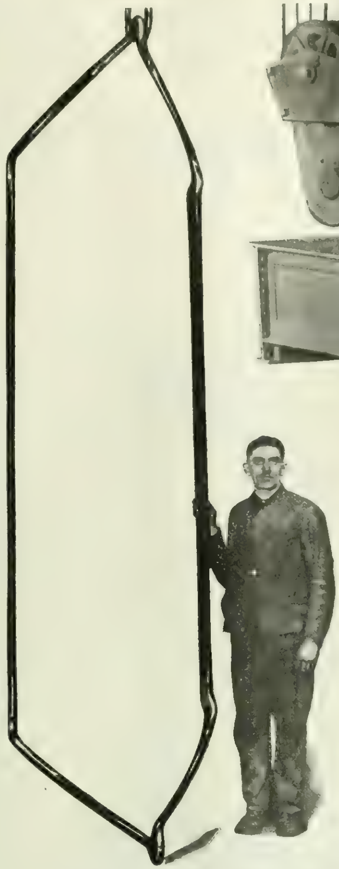


Fig. 3—Completely insulated Armature Coil of first 45,000 kv.a generator

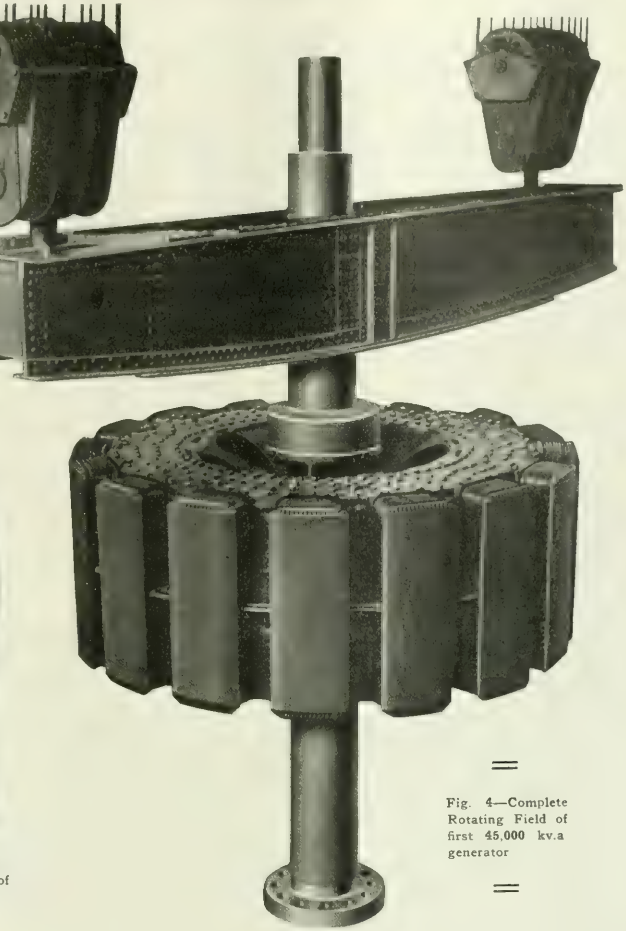


Fig. 4—Complete Rotating Field of first 45,000 kv.a generator

in the slots, a number of thermo-couples are distributed throughout the winding for checking the temperature of the various parts of the winding.

The upper and lower bearing brackets are each made in the form of a spider having the arms heavily webbed for strength and rigidity. Cast iron is used for these brackets since it is more rigid and subject to less deflection than cast steel for equivalent strength. The brackets are each made in two sections, being divided radially through the hub. The surfaces at the intersections are machined and the two sections are bolted rigidly together. The approximate weight of the lower bearing bracket is 45,000 pounds, while that of the upper bracket is 80,000 pounds.

The Bearings

There are three bearings in connection with the generator, the main one of which is the 69 inch Kingsbury thrust bearing carried on the upper bearing bracket. This thrust bearing is designed to carry a load of 1,000,000 pounds including the complete rotating element together with the water thrust on the turbine. The rotating part of the bearing consists of a cast iron collar carefully surfaced on the bearing side and fastened to the shaft. This collar is supported by babbitt-faced segmental steel shoes which are pivoted so that they can rock in any direction a limited amount. The complete bearing is immersed in oil which is kept cool by means of copper cooling coils through which water is circulated to carry away the heat generated in the bearing. A means of circulating the oil is also provided. This is a well known type of thrust bearing having proven satisfactory in many large hydro-electric installations, and is highly favored on account of its low friction loss.

Two guide bearings are used in connection with the generator, one of which is placed above the rotating field and mounted on the upper bearing bracket below the thrust bearing, while the other is below the rotating field and is mounted on the lower bearing bracket. The bearing housings are made of cast iron arranged with water jackets through which cooling water is circulated. These bearings are lined with babbitt of a high grade having numerous grooves for carrying the oil to all parts of the bearing surface. The oil is forced through these bearings by means of pumps.

Underneath the lower frame and supporting the complete generator is a circular cast iron bedplate made in halves which are bolted together. The top of the bedplate is machined so that by means of adjusting screws the proper alignment of the generator can be otbained. Heavy foundation bolts are used to hold the bedplate firmly on its foundation.

Rotating Part

The rotating field, illustrated in Fig. 4, consists of laminated field poles on which are mounted the field coils. The poles are attached to a spider mounted on the shaft.

The laminations for poles are punched to size from sheet steel and are held together by heavy plates at each end together with long rivets extending through the punchings between these end plates. The poles are dovetailed to the rim of the spider and are held in place by means of two tapered steel keys driven into the slots beside the dovetail of the pole. In making the field coils, heavy bare copper strap is used which is formed to shape and then insulated. Sheet asbestos and shellac are used in insulating between turns while on the inside of the coils, adjacent to the poles, and also on the upper and lower edges of the coils, insulation consisting of mica, asbestos and bakelite is built up and moulded to size and shape. The coils completely insulated in this way are baked to consolidate the insulation. Heavy insulating washers placed at the top and the bottom of the coils protect them from the iron of the supporting pole tips and also from that of the spider rim. They also act as wedges holding the coils tightly in place.

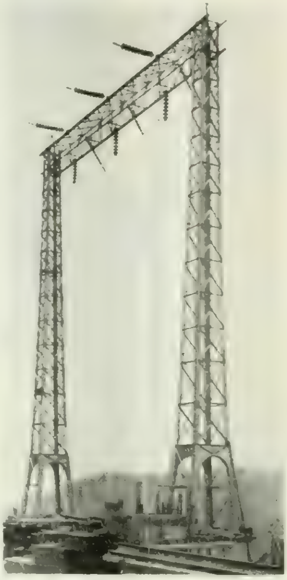
The yoke of the rotating field is formed by the rim of the spider on which the poles are carried. Although the peripheral speed of the spider is not excessive, a laminated steel rim is used, the uniformity of the material for which being much more certain than that for cast steel. The rim punchings have dovetails on the inside for mounting on the cast steel hub of the spider and dovetail slots on the outside for holding the poles. Cast steel end plates bolted through the punchings support the laminated rim. The hub of the spider is a steel casting made in the form of a webbed spider of comparatively small diameter. Dovetail slots are cut in the outer surface of the cross ribs to receive the dovetail of the rim punchings, while the inside is bored out to receive the shaft. Due to the length of this part, three machine fits are used on the inside to facilitate inserting the shaft. A heavy steel key prevents this hub from revolving on the shaft. On the lower side of this cast steel hub there is a brake ring to which air brakes mounted on the lower bearing bracket, can be applied in case of emergency. This cast steel hub weighs approximately 55,000 pounds.

The shaft used in this generator is hollow, there being a hole 8 inches in diameter throughout, which gives a member of maximum strength for minimum weight. Through the portion of this hole between the spider and the cast iron collector rings mounted on the shaft above the thrust bearing, the leads from the generator field to the collector rings are carried. This hole is also useful when it is desired to remove the runner of the water turbine without taking out the rotating part of the generator, since cables can be let down from the crane above the generator through this hole, to support the runner when the shaft is disconnected at the coupling between the generator and the turbine. A heavy cast iron collar keyed to the shaft at the upper end and held by means of a large steel nut, is used to support the shaft together with its impressed load, on the thrust bearing. The shaft of the generator alone is approximately 30 feet in length when measured from the face of the coupling to the top of the thrust bearing and is 32 inches in diameter inside the cast steel hub of the spider. Its approximate weight is 70,000 pounds.

Ventilation

Forced ventilation is used to keep the machine cool. Free air is drawn up from underneath the generator, some of which passes through the spider to the upper side of the rotating field. Vane blowers attached to the spider distribute the air uniformly to various parts of the generator from which it passes through the various ducts in the iron and openings in the coils and the frame to the space between the generator and walls of the pit in which the generator is mounted, whence it is drawn by an exhaust fan. Openings in the generator leading to the generator room above, in which is located the upper portion of the machine, consisting of the thrust bearing and exciter, are closed by means of sheet steel covers so that the heated air does not pass up into the generator room. The quantity of free air passing through the generator is approximately 120,000 cubic feet per minute.

When it is realized that this generator as completely assembled is approximately 35 feet in height from the face of the coupling to the top of the exciter, and 24-1/2 feet in diameter, some conception will be conveyed as to the enormity of the generating units being built and installed in Canada at the present time. While the manufacture of these large generating units embodies only features that have proven satisfactory in smaller sizes, some of the outstanding features worthy of special note which have made feasible the development of large generators of the type described are (a) the rugged mica insulation adopted for armature coils, (b) the laminated steel construction of the spider rim, (c) the low friction losses in the Kingsbury thrust bearings and (d) the rigidity of cast iron utilized in making brackets capable of supporting heavy loads with a minimum deflection.



No 1 Unit Escarpment towers, looking north

Other Equipment

As already noted, the first generator unit installed in this station was manufactured by the Canadian Westinghouse Company in their Hamilton plant. The same applies to the transformer, the breakers and the disconnecting switches. Unit No. 2, just installed, was also built by the Canadian Westinghouse Company, and unit No. 3, by the same company, is nearly completed.

Units 4 and 5, of the same capacity, are being manufactured by the Canadian General Electric Company, who also supplied certain auxiliary equipment in the earlier units. All the 110,000 volt lightning arresters, oxide film type, are of C. G. E. manufacture, as are also the reactors.

The 12,000 volt disconnecting switches for all five units are being supplied by the Electrical Development & Machine Company.

The 110,000 volt transformers for all five units are being supplied by Canadian Westinghouse; this company is also supplying the two 2200 kv.a. service generators.

The History of the Development of Electric Welding

By J. M. F. WILSON, B.Sc.[*]

When two pieces of metal are to be welded together we have two distinct methods of treatment. Where the metals are first heated to a point below fusion and then pressed or hammered firmly together, we have what is known as compression welding including the ordinary forge weld, the electric spot and butt welds and the most recent electro-percussion weld. Where the metals are raised to such a temperature that they will flow together without the use of force or pressure, we have the autogenous or fusion weld, including the oxy-acetylene, the thermit and the electric arc processes. It is my part of the program to deal with the electric arc process.

Two systems of electric arc welding are in use and get their names from the type of electrode used: (1) carbon electrode, (2) metal electrode.

The Carbon Electrode

The carbon electrode process first used by Bernardos more than thirty years ago employed a direct current arc drawn between a carbon rod as positive and the work as negative, a metal filler rod being fed into the flame of the arc by hand. By reversing the polarity several advantages were obtained. The greater heat developed in the positive crater of the arc is transferred to the work where it is most needed, the arc is more stable and the carbon particles are prevented from flowing into the weld, thus preventing the weld from becoming too hard to machine. The carbon electrodes vary in diameter from 1/4″ to 1½″. Greater stability for the arc is obtained by tapering all electrodes to 1/8″ and a lower rate of carbon consumption as well as a softer weld is found when graphite electrodes are used in place of carbon. Currents range from 100 amperes to 800, but in general 300 to 400 amperes with a 1″ electrode is found sufficient.

As regards the filler material, commercially pure iron rods, low in carbon, from 3/8″ to 1/2″ diameter are found necessary for a strong, sound weld. In operating, the surfaces should be chipped clean and the arc formed by withdrawing the graphite electrode from a clean surface of solid metal or from the end of the filler rod held in contact with the parent metal. By this means particles of slag are prevented from adhering to the end of the electrode and deflecting the arc. An inclination of the electrode at 15° to the vertical makes the deflecting force of the air currents constant in direction and steadies the arc.

A surface may be built up either by puddling or by depositing in layers. In puddling the arc melts a small quantity of the parent metal; a small portion of filler rod is next melted off, the rod withdrawn and the added material fused with the parent metal, a rotary motion being imparted to the arc. The puddling drives the slag and oxidized material to the edge and the rotary motion heats a comparatively large area about the weld with consequently less danger of cracking the work or making a hard weld.

In depositing the filler material in layers, we have a similar deposit to that of the metal electrode but wider and higher. The layers are then smoothed over with the arc. When a fine grain structure is required the expedient of hammering the surface as soon as the metal starts to cool is resorted to.

The Length of Arc

As regards the length of the arc, even the lower temperature of the graphite rod as negative will vaporize the carbon in the rod and if a hard weld is to be prevented this must be oxidized. By increasing the arc length so that sufficient atmospheric oxygen will diffuse through the arc stream this may be accomplished. To obtain the same degree of oxidation for the different currents used, the length of the arc would have to be increased in proportion to the arc diameter. As this latter varies with the square root of the current (for the same current density, $c \div d^2 = K$ therefore d varies as $\sqrt{c}$) we find 1″ quoted as the maximum for a 250 ampere arc and 1½″ for a 500 ampere (Viall). On the other hand, we have J. H. Bryan (see Lefax) quoting 3 to 4 inches as the usual length. This latter would necessitate a voltage bordering on the dangerous side. As to its uses, the carbon arc is successfully applied without the filler rod to melt two flanged edges together. With a bronze filler rod, low in tin and zinc, but with at least .25% phosphorus to act as a strong de-oxidizing agent, copper and bronzes have been successfully welded. The class of work to which the carbon process particularly applies is the cutting or melting of metals, repairing broken parts and building up materials, but where strength is a consideration it calls for great skill on the part of the operator. Overhead and vertical surface welds are ruled out but it has a field in the finishing of welds made by the metallic arc process. It is particularly adapted to welding cast steel and non-ferrous metals, cutting cast iron, melting and cutting scrap metal, hardening rails, frogs, and wheel treads. When the art of electric welding is better understood, it may be that the pendulum will swing back again to the carbon arc process from the more recent metal electrode process.

The Metal Electrode

The metal electrode was first used by Slavianoff. Here the negative terminal of the arc is the filler rod itself and we find both bare and coated electrodes in common use. The voltage is low, about 22 volts for bare and 35 for coated electrodes. A highly luminous central core of iron vapour is formed as the arc is withdrawn from the work and this is surrounded by a flame of oxide vapours formed by union with the atmosphere. The intense heat sets up a draft which, combined with local air currents, tends to break through this protecting wall. Consequently it is only by the maintenance of a short arc (1/8″) and proper inclination of the electrode that a successful weld can be produced. The amount of current and size of electrode has an important bearing on the weld. In a test carried out by Wagner for the Welding Research Sub-Committee a double V weld in 1/2″ ship plate showed an increase in tensile strength as

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Before Manitoba Branch E.I.C.

the current was increased from 100 to 200 amperes and he would advocate even 300 amperes for 3/4" plate. British practice at present uses 4000 to 6000 amperes per square inch of electrode, but the Welding Committee recommend 10,000 as more suitable for 1/8" and 5/32" diameter electrodes. That is, a 1/8" electrode could carry 120 amperes through a 5/32" is more generally used for this current.

The Westinghouse company publish a graph showing the relationship between size of electrode, current and thickness of plate, the latter being an important factor, as also would be the temperature of the plate and the type of joint. The values quoted are lower than the above:

Thickness of Plate	Current in in Amperes	Electrode Diameter
1/16	20 to 50	1/16
1/8	50 to 85	3/32
3/16	75 to 110	1/8
1/4	90 to 125	1/8
3/8	110 to 150	5/32
1/2	125 to 170	5/32

This is for a butt weld.

A lap weld between two 1/2" steel plates has a heat storage equivalent to that of a butt weld of two 1 inch plates, hence makes a better weld with 225 amperes and a 3/16" electrode.

An absolutely steady current would seem to be an essential factor when the correct current is obtained. The Wilson Welder Co., who used their "plastic arc" process so successfully on the recovery of the German ships interned during the war, claim that much of the success was due to the automatic control of the current, that as there is a certain critical temperature at which steel can be worked to give the greatest tensile strength and ductility, a variation of 20 amperes above the proper value will cause collection of carbon and slag pockets in the metal, while the same value below will cause the metal to be deposited in globules with holes in the weld to prove that there has been insufficient heat.

Constants Involved

In the types of electric welding machines on the market by far the greater number are d.c. At first, designed from the view of economy in operation, the inclusion of resistances on even a 120 volt d.c. circuit being very wasteful, so called constant potential types were used. This type necessitated a series resistance and in order to dispense with this resistance constant current types of generator were next developed. A third type where the product of volts by amperes is kept constant and termed the constant energy type, is claimed to be superior to the constant current and is also designed to deliver current to the arc without the use of resistors or other energy-consuming devices. In examining the various methods used for regulating the machine we have to bear in mind that the arc itself has some inherent regulating characteristics such that current and voltage are so inter-related that an increase in one causes a decrease in the other. A 1% decrease of voltage from that of the customary 20 volts will cause about 2% increase in current. An increase in the voltage across the arc, when other conditions remain the same, indicates an increase in length of the arc, thus giving the metal a greater opportunity to oxidize in the arc and cause a reduction in the quality of the weld. Hence a type of machine which would make it difficult to maintain a long arc would be an advantage. Now the rate of consumption of the electrode is proportional to the current and is independant of the voltage across the arc and the length of the arc. In the constant-energy system when the operator shortens the arc, the increase of current consumes more electrode, and brings back the length of the arc to its original length. Lengthening the arc decreases the current and at the same time the consumption of wire, again automatically bringing the length of arc to normal. Too great a length will reduce the current to such an extent that the arc will go out. With a constant current this regulating factor is absent and a long arc is made possible. The oxidation of a long arc is shown by the increase in red oxide (Fe_2O_3) covering the weld. The black oxide (Fe_3O_4) does not contain as much oxygen.

Constant Potential Type

As examples of the constant potential type we have the Wilson Welder Company's plastic arc set, a flat compounded generator where the current is automatically controlled by a solenoid operating a carbon pile resistance for small variations of current. Large current variations are obtained by means of a variable grid resistance. The volt-amperes at the arc are constant for each setting, hence the set might also be classified under the constant energy type. It is usual to include a reactance in the welding circuit to smooth out variations of current caused by sputtering of the arc, but in this particular set the series winding on the solenoid acts in this capacity. The welding current passing through the carbon pile and the solenoid causes the plunger of the solenoid to slacken the springs compressing the pile when the arc is struck. When the current decreases, the pull of the plunger decreases, and the current is adjusted automatically. In the earlier models the operator is able to control the amount of current which is to be kept constant by means of a pilot motor which shifts the fulcrum of the pressure mechanism as desired.

Constant Current Type

As an example of the constant current type we have the Lincoln Electric Company's set comprising a separately excited shunt field and a differentially wound series field changing the voltage from 65 on open circuit to 20 on load. The series field is varied by means of a diverter so that currents of 80 to 200 amperes may be obtained. An external reactance is used.

Another example of the constant current type is the Westinghouse company's latest model. The generator is a commutating pole machine, with a series winding, a separately excited shunt field and a second shunt winding connected between one exciter terminal and one generator terminal, the other exciter and generator terminals being connected through a resistance R_1. Under open circuit and normal welding conditions this second winding is excited by the generator voltage and assists the first shunt winding (separately excited) in maintaining the generator voltage through R_2. Under short-circuited conditions the second shunt winding is excited from the exciter through R_1 and opposes the field of the first shunt winding. As the series winding also opposes this first shunt winding all the time, both assist in reducing the short-circuit current to practically the same as the welding current. The variable rheostat in the generator separately excited field allows control of currents from 50 to 200 amperes. An external reactance in the welding circuit also keeps down the short circuit current at the moment that the arc is struck and stabilizes the arc. The exciter voltage is maintained by a compound winding at 125 volts and the generator pressure falls from 60 to 20 volts.

The latest constant energy type of the General Electric Co., uses no separate exciter but makes use of the third brush idea for controlling the current through the shunt winding. Time will not admit of full details.

I might mention here that very good results have been obtained in welding and in holding a steady arc by using an ordinary battery charging generator of 80 amperes capacity, using a very weak shunt field and a cumulative series winding.

Selection of Electrode

The physical properties of a weld depend on the crystal structure, gas holes, slag inclusion, impurities and composition. What we require in arc welding is a fine grained casting, free from blowholes, slag inclusions and impurities. It is noticeable that the first part of a weld will show a fine grained structure merging gradually into a coarse grain as the plate heats up. These coarse grained crystals are what is known as columnar and wherever these occur we have brittleness. Varying methods have been tried to produce the finer grained structure, viz., hammering the weld, depositing the metal rapidly in thin layers and cooling by a stream of water. The structure in the interior of the weld, however, (see Rawson) is of fine grain and it is to be inferred from this that the subsequent heatings of the successive layers refine the first layers. It has also been found that the higher the current density the greater the collection of columnar crystals.

Gas holes found in all electric welds are a great source of weakness. It is not the electrode alone that can be blamed for this but also the plate. Any substance, such as carbon, having a great affinity for oxygen will produce gas holes. Carbon monoxide is formed and trapped in the weld by the rapid solidification. Usually any dissolved gas in the electrode is liberated as it passes through the arc stream causing certain electrodes to be unworkable through "sputtering," (the General Electric Company claim that by merely dipping electrodes inclined to sputter in milk of lime (white wash) sputtering may be avoided) but the carbon in the plate dissolved in the welding pool reacts with the iron oxide in the pool and forms more CO with no chance to escape. Examination of welds with a carbon free electrode on a carbon free plate showed only an occasional small gas hole, while it is well known that steels containing only .3% carbon are often difficult to weld.

Certain electrodes are on the market which are annealed. As the effect of annealing is to decarburise the outside layers and hence reduce the amount of carbon, it may be for this reason. Slag inclusions are also a source of weakness, particularly where covered electrodes are used in inexperienced hands. Slag becomes entangled in the deposited metal and fails to rise to the surface. Wrought iron welding wire contains considerable quantities. Slag aids the weld, however, by preventing surface oxidation of the pool.

Impurities

Under the term impurities the oxygen content which is characteristic of the electric weld is not alone sufficient to account for its want of ductility, but we will deal with the oxide first. In all specimens examined microscopically are found tiny globules of oxide having no definite arrangement and scattered indiscriminately throughout the crystals of iron, (Fig. 2). A film of oxide is also found surrounding the "metallic globule inclusions," Fig. 1. It is supposed that these globules are small metallic particles formed as a sort of spray at the top of the electrode and have failed to fuse in with the metal subsequently deposited over them.

It is a curious fact, borne out by analysis and tests from the Bureau of Standards, Strauss and others, that electric welds show over a .12% nitrogen content, while acetylene welds give only .02%.

Nitrogen in steel is an element producing a great degree of brittleness, as small a quantity as .06% reducing the elongation on a .2% carbon steel from 28% to 5%.

Microscopic examination shows a large number of lines, needles or plates in the weld which resemble iron highly nitrogenized. These occur within the ferrite (or pure iron) crystals, and are more abundant in the columnar and coarse grain crystals. It might be assumed that rupture takes place along these nitride plates (see Fig. 3) but it is found that the effect of the oxide inclusions and films, the metallic globule inclusions, and the lack of adhesion between successive layers of the weld, makes the nitrogen feature of small importance as a cause of rupture. While these unsound spots are no doubt the cause of the low ductility of the weld, the metal retains its inherent ductility, as microstructure shows after bending tests on the weld.

Other impurities which must be kept to a minimum, both in plate and electrode, are sulphur and phosphorus, the latter causing a brittle envelope round the crystals. As regards the composition of the electrode, some tests which were carried out for the Welding Research Sub-Committee by the Bureau of Standards bring out some interesting points. Two electrodes, one (A) a "pure iron" electrode, and the other a low carbon steel (B), prepared to specifications, were tested for content before and after welding.

		C	Si	Mn	N	Tensile Strength
"A" Iron	Before	.058	.03	.042	.003	60,000
	After	.031	.007	0	.143	50,000
"B" Mild Steel	Before	.15	.06	.47	.003	70,000
	After	.024	.008	0	.14	,50,000

Note the heavy loss in C and Si and Mn where they occur in large quantities, and the gain in N.

(To be continued)

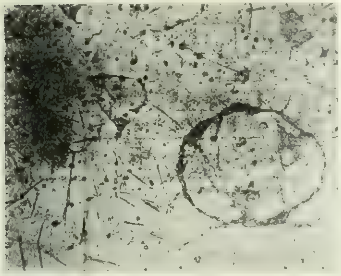
Fig. 1—Microscopic Evidence of Unsoundness. The Globule at the right is surrounded by a film of Oxide, and the fracture of the specimens when tested in tension originates in such unsound areas

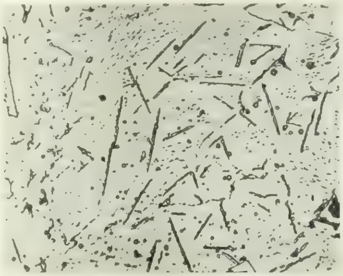
Fig. 2—Characteristic Feature of Arc-Fused Iron. The "Needles" or "Plates" are due to the increase which occurs in the nitrogen content during fusion

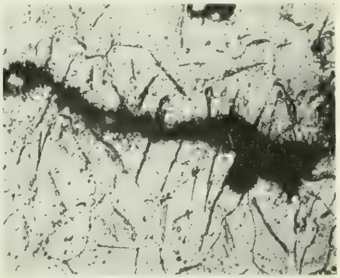
Fig. 3—Relation of Path of Rupture of the Microstructure of Arc-Fused Iron. The course of the crack or tear in the metal which was produced by stressing in tension does not appear to have been influenced appreciably by the "Nitride Plates"

Mr. J. J. Seguin after 27 years of service in various capacities with the Bell Telephone Company, has resigned to take up commercial activity on his own behalf. It was in 1895 that he entered the employ of the company as fireman in the Eastern Division plant department and worked his way up to the positions of climber, sub-foreman, foreman, district plant chief, and, finally, plant chief of district No. 1, at Quebec. He has thus had a varied and valuable experience, and is widely known. The industry's good wishes are with him in his new undertaking.

The Development of Wireless IV

A Series of Short Interesting Articles Covering Wireless Progress to Date

By F. K. D'ALTON

The two element valve which is used as a rectifier was invented by Dr. J. A. Fleming. A remarkable improvement was made by Dr. Lee DeForest, who inserted a third element commonly called a grid between the plate and the filament.

Whereas, in the two element valve, the plate current increases with both the temperature of the filament and the potential of the plate with respect to the filament, it was found that with filament temperature and plate potential both fixed, the plate current will vary with variations in the voltage of this grid with respect to the filament. The current was so arranged that the grid, with practically no power supplied to it was able to control a measureable amount of power in the plate circuit. The valve is a power relay and what is more the moving parts are electrons, parts of molecules, without inertia, hence variations in plate current follow the same wave form as the grid voltage (voltage of grid with respect to filament). Thus the valve with the three elements may be used to amplify waves of almost any frequency. As a detector it is much better than the crystal, giving louder signals and not being thrown off adjustment by the transmitter in the same station.

The telephone receivers are placed in the plate circuit and across them is usually placed a small condenser to act as a by-pass for the high frequency (radio frequency) components in the current.

The received and tuned waves are not rectified, but are distorted so that a component is added to the otherwise steady plate current; this gives the necessary variation to enable the phones to give forth sound waves.

If a small transformer, known as an amplifying transformer, have its primary winding connected in the plate circuit instead of the phones, and also have its secondary winding connected between the grid and filament of a second valve in the plate circuit of which the phones are now placed, we have what is known as a cascade connection with one step of amplification. The signals will be amplified and be from six to ten times as strong as with one valve only.

Considering that each step of amplification multiplies the signal strength by ten, the effectiveness of amplifiers will be at once recognized, and their use in increasing the workable distances by leaps and bounds will also be realized.

The three electrode valve, as well as all the other detectors which use phones, gives quantitative response and can be used for detecting any waves where the variation in the amplitude is sufficiently fast to be within the range of sound.

We may mention here that quantitative response in detectors was suggested by Prof. R. A. Fessenden. He also advocated the use of continued waves,—i.e., undamped waves,—and suggested both a method of producing them and also a scheme for detecting. His transmitter was to be a high frequency (100,000 cycles, or higher) alternator which would charge the aerial by direct connection between it and ground thus causing the radiation of long wireless waves. Messages could be sent by interrupting the current with a key. No spark gap was necessary and an audible note was not produceable with the detectors so far described.

The continuous wave when received simply displaced the diaphragm but did not cause vibrations and hence no sound, so different schemes had to be used. The ticker detector was the first step in reception of "C. W." (continuous waves). It consisted in a mechanical interrupter in the receiving circuit between the tuning device and the detector which chopped up the incoming signals and produced an audible signal in the phones while the waves existed. This, however, was considered an improvement, since the magnification by tuning was greater for a given strength of wave than with damped waves.

The high frequency alternator is used in many transoceanic stations and is considered best for this class of work.

Prof. Fessenden suggested a new and novel means of detection for continuous waves. He generated at the receiver a current of nearly the same frequency as the signals he was receiving but allowed the difference in frequency to be within the range of sound, thus if the incoming wave had a frequency of 100,000 cycles per second and the current generated at the receiver was 99,000 or 101,000 cycles a second, the "beat" note equalling the difference would have 1000 cycles per second and be audible, whereas neither received nor generated frequencies are within the audible limits. This method of detection is known as "heterodyning" and gives a greater volume of sound from a given signal than any other scheme This again increased the workable distances and permitted the pitch of the signals to be adjusted at the receiving end, where they may be given a suitable note, enabling them to be detected through the interference. It allows a greater discrimination between stations than was ever obtainable with spark stations.

Poulsen then brought out his famous "arc" transmitter wherein the higher harmonics in an electric arc were made to build up high frequency currents in electrical circuits. The frequency was determined by the constants, capacity and inductance, and a fairly uniform continuous wave of radio frequency was obtained. Some attempts were made to use this wave for radio telephony but without great success, as no suitable transmitter could be made to carry the heavy currents and at the same time be actuated by the voice.

Arc sets are used for telegraphy across very long distances and are preferred in the navy stations of the United States.

There is still another, and very convenient method of generating continuous waves. It is by means of the three electrode vacuum tube already described as a relay detector.

It will be noted that the three element valve receives the signals from the tuning device in the form of voltage variations which, due to the action of the valve, appear as current variations in the plate circuit. Captain E. H. Armstrong inserted a coil in the plate circuit and placed this so close to the coil of the tuning circuit that it supplied part of the power of the plate circuit back to the grid circuit. This had the effect of still further increasing the intensity of the signals.

,Since variations in grid potential cause corresponding variations in plate current due to the valve alone, and the changes in plate current cause variations in grid voltage through the coupling of coils alone, Armstrong found that an oscillation was set up in both circuits. The valve then became a generator of high frequency currents, the actual frequency of which depended solely upon the electrical constants of the circuits.

These quantities—capacity and inductance—were easily varied, thus causing changes in frequency of the generated currents. For heterodyne reception these valves are very convenient. With one "oscillating" valve a continuous wave station may, when tuned in, be detected and the note adjusted very readily by manipulation of the small variable condenser in the tuning circuit.

Furthermore by properly proportioning the coils and condensers in circuit—i.e. in the coupling—these high frequency oscillations may be made to cause currents of the same frequency in a tuned aerial circuit, thus becoming a transmitter and radiating a continuous wave of almost pure (sine wave) form.

A key may be inserted in the grid circuit, in the plate circuit or possibly in the ground or aerial leads and thus break up the radiations into code letters, permitting the sending of messages by dots and dashes. Since the same little

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Licensing Contractors and Journeymen

An Ontario Act Respecting the Examining and Licensing of Electrical Contractors and Journeymen Electricians

Electrical contractors and dealers throughout the province of Ontario will be keenly interested in the Bill (No. 105, 1922) introduced on March 8 in the local Legislature by Mr. Swayze, labor member for St. Catharines. The Bill is entitled "An Act respecting the examining and licensing of electrical contractors and journeymen electricians" and is a revision of a similar Bill that was given its first reading in the dying hours of the 1921 session of the Legislature.

Reproduction of the Bill in full would occupy more space than we have at our disposal, but the following copious extracts contain the more important points of interest:—

1. This Act may be cited as 'The Electricians' Licensing Act, 1922.

Definitions

2. This section defines the various terms "contractor," "journeyman," "license," "inspector," "apprentice" and "board." This section differs from the corresponding section in the 1921 Bill in that the Act is to be administered by the Department of Labour, where formerly it was the Department of Public Works.

Application

3.—"(1) The provisions of this Act shall apply to all contractors, journeymen and inspectors engaged within the province in the business of placing, installing, maintaining, repairing, replacing or inspecting in or on any class of structure any conduits of any description, designed for the purpose of enclosing or carrying any electrical conductor upon which is impressed and E. M. F. equal to or higher than the voltage prescribed in the wiring regulations issued by the Ontario Hydro-Electric Power Commission, between any two conductors and ground independent of the characteristics of the current; of placing, installing, maintaining, repairing, replacing or inspecting in or on such structures, of any conductor switch, attachment, fitting or any element whatsoever of an equipment designed for the purpose of supplying such electrical service, or for any purpose in connection with such an electrical service.

"(2) The provisions of this Act shall not apply to such work within power houses, sub-stations or other places wherein the business of generating or distributing electrical power is carried on by public service corporations or by municipal departments, and where such work is installed by employees under the direction of officers of such public corporations or municipal departments, except in structures wherein the public, other than employees of such public service corporation or municipal department have free access on business.

"(3) The provisions of this Act shall not apply to such work on street railway cars or locomotives, or on railway cars or locomotives which are the property of municipal departments or of public service corporations, and where such work is installed by employees under the direction of officers of such municipal departments or public service corporations.

"(4) No apprentice or other person shall perform any electrical work or install any electrical material or appliances within the meaning of the Act, except as an assistant to, in the presence of, and under the direct personal supervision of a journeyman continuously employed on the same contract or job and licensed under this Act, and only one apprentice shall be allowed to each journeyman as assistant on any job.

"(5) Nothing in this section shall be taken to apply to the insertion of incandescent lamps in sockets or receptacles, or the replacement of such lamps, the carboning, trimming, or operation of arc lamps, the lawful connection of utilization equipment to supply by means of attachment plugs or the use or operation of the same, or the lawful replacement of fuses controlling circuits or equipment."

4. States that all electrical contractors and journeymen shall be subject to examination.

5. This section is a little indefinite and we reproduce it in full; it runs as follows:

Board of Examiners

"The Lieutenant-Governor in Council, upon the recommendation of the Minister, may appoint a board of examiners, consisting of three members, who shall be qualified in practical electrical work, one of whom shall be an electrical contractor, and one who shall be a practical journeyman electrician, and who are conversant in a practical degree with the qualifications necessary to be held by a person described as an electrical contractor or an electrical journeyman, who shall hold office during pleasure and who, subject to the regulations mentioned in the next following section, and to the approval of the Lieutenant-Governor in Council, shall prescribe the subjects in which candidates for a contractor's or journeyman's license shall be examined, and conduct and provide for and supervise the examinations of candidates and report thereon to the department."

6. Outlines the duties of the Board of Examiners.

License Forms

7. "Four license forms shall be issued, designated as follows:—

License A,—which may be issued to any person who has satisfactorily passed the examination prescribed for journeymen electricians, and has filed an application to be registered as a contractor in the examiner's office and paid the fee prescribed by subsection (2) of section 8 of this Act.

License B,—which may be granted to any company, association, corporation, or firm doing or wishing to do business as contractor for electrical installation, provided one of the members of the said association, company, corporation, or firm, or at least one person in its employ, holds a certificate of journeyman electrician given by the examiners, and that the fee for the license has been paid.

License C,—which may be given to a journeyman electrician having at least four years' experience, and who, after passing his examination successfully and complying in every respect with the prescription contained in the forms prepared by the examiners, has paid the fee prescribed by subsection (2) of section 8 of this Act.

License D,— which is the special license authorizing a person with a knowledge of electricity employed in a factory, warehouse or public building subject to exceptions specified in subsections 2 and 3 of section 3 of this Act, to do work in connection with the repair and maintenance of electrical installations in the said public buildings, and the person applying for such license must pass an examination before the board of examiners."

8. Has reference to the meeting and organization of the Board of Examiners, the issuing of licenses and the fees. Subsection 2 of this section differs from the 1921 Act in that it definitely appropriates all the fees to reimburse the examining board for its services. This subsection is as follows:

Fees

(2) "If satisfied as to the competency of the applicant, the

board shall thereupon issue to such applicant a license in accordance with section 7 of this Act, authorizing him to follow, engage in or work at the trade or occupation of electrical installation in the Province of Ontario as specified under that section, and the examination fee shall be $5.00 for contractors and journeymen electricians and shall be applied in reimbursing the examining board for its services, and the license fee, which shall be $25.00 for contractors and $2.00 for journeyman electricians, shall be renewed annually upon payment of $5.00 by a contractor and $2.00 by a journeyman electrician, and shall be applied in reimbursing the examining board for its services."

9. Outlines the duty of the secretary.

10. Notes that candidates failing in one examination may take additional examinations.

Bonding

11. "Every contractor before obtaining a license shall file a bond with the board of examiners in the penal sum of two hundred dollars, conditioned for the faithful performance of his duty as licensed contractor, and for his not permitting any electrical installation that he is called upon to do, to be performed by any person in his employ, except by such persons as are authorized to do electrical installation under this Act, and for his not violating any of the terms and conditions thereof, or any amendment from time to time made thereto."

12. License may be revoked.

13. Penalty for failure of contractors to obtain license, a fine of not less than $50. nor more than $200.

14. Penalty for journeyman not obtaining license, a fine of not less than $5 nor more than $50.

15. Special license to industries.

16. Penalty to industries for not obtaining license, not less than $50 nor more than $200.

17. Deals with the appointment of inspectors.

18 & 19. Requires the contractor or journeyman to furnish satisfactory proofs that he is licensed, subject to a penalty of not less than $50. and not more than $200.

20. This Act shall come into force July 1, 1922.

This Bill will doubtless come up for its second reading at an early date and, in view of the importance of the matter of licensing contractors, in Ontario, it is very important that this Bill should have their careful consideration immediately. It would be advisable to bring any criticisms to the attention of the secretary of the Ontario Association, Mr. J. A. McKay, at 24 Adelaide St. West, Toronto.

Toronto District Electrical Contractors and Dealers Have Bumper Meeting

The regular monthly meeting of the Toronto District of the Ontario Association of Electrical Contractors & Dealers was held on March 22. The Canadian General Electric Company very kindly placed the assembly room in their Wallace Avenue plant at the disposal of the Association and, in addition, provided the entertainment portion of the evening's proceedings.

Following the general business meeting, with Mr. Drury in the chair, a varied program was provided, consisting of songs, jazz band selections, short addresses, etc. A particularly interesting item was a series of sales dialogues—on vacuum cleaners, electric washing machines and electric ranges. Some very clever suggestions were passed along to the dealers, which will doubtless be used in their daily sales talk.

Another interesting feature of the entertainment was a model electric store that had been set up for the special benefit of the members of the Association. A number of interesting points were incorporated in the plan of this store; for example, the difference between dilapated looking shelves with boxes of different colors and sizes, in comparison with neater shelves, containing boxes of uniform color and size, were shown. One corner of the shop was given over to the display of lighting fixtures, the idea underlying this display being that the various fixtures for the same room should go together. These fixtures were shown in groups, i.e., the ceiling fixtures, wall fixtures, etc., were shown in the same little compartment, with no other designs present to attract the attention while consideration was being given to that particular design. Another feature was the placing of the lamp counter at the extreme rear of the store, the idea here being that more people came into the store to buy lamps and, therefore, are obliged to walk past the other appliances in the store to make their purchases. A couple of good model window displays were also shown and Mr. Rimmer, who had this matter in charge, should be congratulated on the results of his labor.

Another item on the program was a short talk on artificial sunlight, by Mr Dan Logan, followed by a moving picture story illustrating the development of illumination from the earliest days, when the caveman produced his fire by striking two flints together, to the most highly developed incandescent lamp of the present day.

Mr. C. S. Mallett, superintendent of the Wallace Avenue plant, made a few remarks of appreciation to the men who had assisted—both members of the company and others—in ensuring the success of the evening's program

Electric Home No. 2, Toronto

The second Electric Home exhibit and demonstration campaign being put on in Toronto by the Electric Home League will open on Saturday, April 1, and will continue for two weeks. As the first Home was shown in the northwest section of the city, the second Home has been chosen in the east end. The house is located near the end of Gerrard St., just beyond Coxwell Avenue, in what is known as the Kelvin Park Estate. Mr. Kenneth A. McIntyre, who acted as manager of the first Home and has since visited a number of cities in Canada and the United States in connection with his work for the Society for Electrical Development, is again in charge. The various committees are working hard and duplication of the success of the first Home is fully anticipated.

The Development of Wireless

(Continued from page 38)

vacuum tube may be used as detector, amplifier or oscillator it becomes a very useful device. It occupies very little space in comparison with other equipment giving the same strength in radiation of continuous waves, and in the smaller sizes is so low in cost that it is within the reach of most amateur operators. By means of vacuum tubes, wireless waves are generated, detected and amplified. The whole system then depends upon them. They have revolutionized radio communication and made possible very simple radio telephone transmission, where even after hundreds of miles have been travelled, the receiver signals, voice or music may be made louder than the original.

In the sending of continuous wave radiations, where a valve is used as a generator, the transmitter is particularly quiet, the tapping of the key being the only noise.

Electrical Co-operation in Vancouver

Pacific Coast Province Meeting Returning Activity More Than Half Way—A Visit From Special Representative of National Contractors' Association

An extremely interesting and, to the Vancouver contractor-dealers, very profitable two days' visit from Mr. Laurence W. Davis, special representative of the National Association of Electrical Contractors and Dealers ended at a largely attended dinner meeting of the Electric Service League on the evening of March 2nd. Mr. Davis was the chief guest and the speaker of the evening, and two other visitors prominent in electrical circles in Canada, Mr. Pike and Mr. Carswell of the Northern Electric Company, Montreal, were also welcomed. Mr. Pike, who is no stranger to the fraternity in Vancouver was asked to address the meeting, and he gave a sort of curtain raiser by describing the successful Electric Home staged at Toronto, which he had visited before coming west. He also spoke of the similar display at Hamilton and at Montreal, the latter being at the time on exhibit.

Mr. W. G. Murrin, assistant general manager of the B. C. Electric Railway Co., who occupied the chair, introduced Mr. Davis with the comment that the visit of that gentleman a year ago had shown prompt results in the new life taken on by the Vancouver Contractor-Dealers Association. His present visit showed his real enthusiasm for his chosen work, as he had been in the hospital for an operation in San Francisco on his way to Vancouver.

As he was addressing not only the contractor-dealers but the Service League, Mr. Davis in his opening remarks put the question of what the Service League stands for. Answering, he said it was the grouping of the entire industry, the common meeting ground for all branches of the industry. The electrical business is unique in being so closely tied together. No other industry has all its branches so closely related. Sometimes, it seemed as if they were prone to forget that it was a number of units after all, and that one cannot lean too much on another. The object of the Service League was, he said, "to sell to the public the idea of electric service. But," he warned "it is not going to take the place of individual effort. Each of you has to build his own business. The league is responsible to the public and each of you has a duty, through the league, to the public."

Touching on a comment made during the early part of the evening on the small attendance of the contractor-dealer class at meetings of the industry, Mr. Davis came to their defence. He pointed out that while he was very much in sympathy with making the contractor attend all meetings, yet as a class these men had to give up their own time for all meetings held in business hours, while nearly all of the other representatives were coming, and quite rightly too, on their company's or employer's time. Referring to the Service League he said, "You have in the league, what they aim at in the East."

Analyzing the electrical industry, Mr. Davis showed how it was primarily based on the distribution of electric energy—to get the people to use the product of the central station. The manufacturer is an outgrowth of this need, as he has been making the appliances required to use electric energy. The jobber came into the industry to meet the need of the manufacturer for a means of distributing his products. There is a definite function for the jobber—to deliver to the retail trade. Finally came the contractor-dealer. And he has a problem no other branch of the industry has, "though you will recognize it as your problem too." The manufacturer can study his costs and fix the price of his product; the jobber can do the same; the central station can arrive at the cost of production and distribution of electric energy. They can also have technical and expert men to work out their problems of cost.

Contractor-Dealer Represents Whole Industry

Then comes the final "contact" with the public. All the effort, all the production, all the output of the electrical industry must pass to the public through the contractor-dealer. And each time he faces an unknown quantity in every job that comes up. "Do you realize what he faces?" queried the speaker. "He has a very serious problem. The central station, the manufacturer, the jobber, all depend on the kind of an outlet they have through the contractor-dealer."

Speaking for the contractor-dealer, he said: "We are the representative of the central station, the manufacturer, the jobber, to the public. How much of an advance have we made since the day of the first incandescent electric globe being put before the public? How do we stand before the public? What is the impression we make? The industry cannot afford to let the contractor-dealer struggle alone with his problem," was the emphatic assertion Mr. Davis made. He showed how good will depended on the type of representative of the industry meeting the public. The electrical industry had not yet attained to placing the contractor-dealer on the same plane with the other branches of the industry. They hoped to see the time when this would be so.

"Here is the one idea. Let us make these men competent to be successful. Then it is up to them."

"It is easy to be up-to-date when you are prosperous" said the speaker, adding that the contractor-dealer could not be prosperous unless he was doing business on a profitable basis. How to get at the problem was through the Electric Service League and the Contractor-Dealers Association. They needed all the men in the industry "sold" on the idea. Contracting on competitive basis was only as high as the lowest bidder. And that is the real source of weakness. Some firms might become successful by getting out of the competitive field and working up a business on time and material basis. Such a course would come as a firm built up confidence on the part of the public. So long as contracting depended on competition all must be in the league and association work.

Success is Based on Knowing Costs

There can be no success till the cost of operation has been met. There, said Mr. Davis, addressing himself to the contractor-dealers, is the whole secret of why the contractor-dealer has not advanced. Each job has a definite relation to the whole year's business, or to that of, say, a five year period. But this was no exception to the rule, for that fundamental principle applied to every part of the electrical industry and to every line of business in the world. Can the jobber say today that he will sell for 10 per cent less because he happens to want the business? He has to apply the same rule.

Following his theme Mr. Davis undertook to explain what is overhead—the cost of giving service to the public. When a contractor-dealer figured on a job, the cost of material and labor was only the beginning of his cost. When, he asked, are you going to pay the jobber? The first of the month. But at the first of the month the landlord had to be paid, and every one of the other costs of operating a business. While acknowledging that the contractor did "not always forget to add the overhead" he asked "Why don't you give the customer the material sometimes? Or the labor? It would be just as reasonable." On this question of figuring cost and profit he asserted that the average man actually does try to deceive himself into the belief that he has figured himself a profit when he submits a bid.

In a study of 2300 contractor-dealers made by the National Association, in 1920, the figures showed that the average cost of operation—the item of overhead—was 23.63 per cent. That was on a gross business of $87,000,000. The 1921 figures were not yet complete but they were going to be about 1½ per cent higher. But that is much lower than the average contractor can operate under. Of the contractor-dealers written to for the purpose of obtaining these figures, only half replied. Very naturally, the most satisfactory returns were reported by the largest concerns. Of these, there were five whose business ran from $800,000 to $1,000,000 a year. Their overhead was low. In a personal examination of the books of over 100 contractor-dealers, Mr. Davis said, there were only one or two who had got down to the average of 23 per cent overhead. Some were as high as 38 per cent and the average was nearer 29 than 28 per cent.

The Man the World Seeks

"If you can succeed in making your overhead 18 per cent, then you are the man the world is looking for," said Mr. Davis. "But you cannot succeed if you are fooling yourself into thinking it is."

One of the greatest difficulties under which the contractor-dealer class labors is the fluctuating, varying membership. In Los Angeles a year ago, stated the speaker, there were 262 contractor-dealers. Today there are 498. But that is not the worst of the record. Every week last year in Los Angeles 17 men entered the business of contractor-dealer and 11 withdrew. They have a way of checking it up there, because each man engaging in the business is required to put up a cash deposit of $50. which is returned to him when he gives up business in the city.

"Does that make you realize what the industry is up against?" queried the speaker. "---A constant succession of failures."

Falling back on the trusty blackboard, with a piece of chalk Mr. Davis rapidly and graphically illustrated his discussion of the true basis of working out cost, the rock on which so many had struck and gone down. With a gross business of $10,000 per year, which was, he emphasized, the average for a large number of the smaller contractors, it required of that sum, $2,300 as a mimimum amount for the mere cost of doing business. "And of that $2,300 you can only pay yourself an average of $848. wages for the year. The rest goes in upkeep of "flivver" with which tools, men and materials are taken to the work, taxes, the tools required, rents, insurance, leakage on materials, and the hundred and one large and small items paid out in operating. Eighty per cent of the contractor-dealers are not doing a ten thousand dollar gross business yearly," was his assertion.

Wrong and Right Estimating

Turning to details, Mr. Davis told of a case which he had gone into with a firm in a U. S. city, which he visited. They were doing a $200,000 business, and were considered successful and enterprising. Their claim was to a 20½ per cent overhead item. Testing their methods of figuring, he asked for an example. They took 23 per cent as an overhead, and gave him the following:

Cost of materials	$100.00
Overhead	23.00
Profit	10.00
Selling price quoted	135.00

To show the error in this method of figuring, he pointed out that 23 per cent overhead is of **all the business you do,** or of the selling price of all jobs. Then he gave a blackboard example of the correct method of working out the problem. "The selling price is your **final** figure. Therefore it is 100 per cent. With overhead assumed at 23 per cent, and profit say 10 per cent you have:

Overhead	23 per cent
Profit	10 per cent
Cost of Material	67 per cent
	100 per cent

"I do not want you to have any rule," urged Mr. Davis with great earnestness, "I want you to know **why.**" Applying the figures of percentage to the job above referred to he worked it out as follows:

Cost of material, $100.00, is 67 per cent of selling price.

67 per cent=$100.

1 per cent= 100÷67=$1.4925.

100 per cent=$1.4925 x 100=$149.25

23 per cent, or overhead=$1.4925 x 23=$34.23.

Subtracting this corrected amount for overhead from the quotation above, you have:

Selling price quoted	$135.00
Cost plus overhead	134.23
Actual profit	.67

Mr. Davis said the struggle of destructive competition is killing the business of the contractor-dealer. No fixed price basis is possible, and most of them were not working on the correct method of cost, as illustrated. The small contractor had no chance in competition, so he goes out to get the cheapest material possible. "What does inspection mean?" he asked. "You know it simply means that the city inspector says: 'This job is just as poor as we will permit to pass'." That, he showed, was the wrong basis. He illustrated, by the plumbing industry, how the public were sold to the idea of comfort. They spend their money on it, on getting something that will benefit them. "But because we are always telling the public that their work ought not to cost so much, we cannot sell them service as it should be sold. Competition is the cause of all the evil."

It was a condition, he said, which cannot go on. The manufacturer wants to sell his products, the central station is looking for a load to even up the low places in the 24 hours, and thus cheapen the cost. "We have this job to do —it is nothing more nor less than putting the industry on a business basis. We do not want cost any lower than necessary to make the men in the industry successful. There would not be the constant influx of cheap men if we convinced the public we were trying to give them better service, that we were banded together to do it.

On the subject of residence wiring he warned his hearers not to mix up the labor question with the educative campaign. Vancouver had led the way in securing a permanent secretary for the Electric Service League. Mr. Chatfield had a sphendid record and was doing good work since coming to Vancouver.

Business Best Game in the World

"Business is one of the best games in the world if you know the rules and can stop worrying over how to play," was one of the typical remarks with which Mr. Davis' address was freely punctuated, and it seemed to touch a responsive chord. On the question of cutting costs, speeding up collections, and thus increasing net profits, Mr. Davis' blackboard again came into play. He asked a number of questions, such as: "When do you send out your bills?" to which the answers varied widely. Some sent them out when the job was done, some when the time slips came in, some at the first of the month. He said the average was found to be five months. The man who shortened his collections to thirty days was turning his money over oftener than the man who waited five months. The same applied to buying materials. It was false economy to buy materials for five or six months ahead. Even a discount for quantity did not cover the loss in having the capital locked up. Often too the man who bought a thirty day stock took his discounts where the other could not, gaining an advantage there. Another saving in short date buying was avoidance of loading up with stock that became unsaleable. These points taken into consideration soon cut the overhead—it was the basis for doing good business.

Function of Association

"While your association gives you ideas, helps you with your problems, there never will come a time," said Mr. Davis, "when your success will not depend on your own desires to use what your association gives you. You can sit down and ride on a street car, but in business you have always to keep on running. There was a danger in success, that a man might ask himself why keep on belonging to the Electric Service League. But this League is never going to put you in such a position. It is going to need you and you are going to need it." Of the 43 founders of the National association, 38 were still in it, and every man was successful. In their own League in Vancouver he said "You will get your reward in proportion to the time and interest you put into the League. It does not want your money—it wants your time, thought and energy—you.

Capital is now becoming available for building and there will be more and better business in the future. It was up to the contractor-dealer to make use of the opportunity. In no place in all his extensive travels in U. S. and Canada has Mr. Davis found the contractors as a class more awake to their problem, and more anxious to find the way out. There was a great improvement in merchandising methods in the stores, he had observed. Turning to the general subject of the central station and merchandising, he said that when the power load and the distribution of appliances was satisfactory there would be no need to ask them to drop out of merchandising. The central station is only "in" merchandising to see that the public gets adequate distribution of electric appliances and not to see what they themselves can sell. The central stations were educative pioneers in telling the public the advantages of electric appliances. Now it is different; there are many educative agencies. Concluding, Mr. Davis said if the League succeeds in achieving co-operation in the ranks of the electrical industry in Vancouver it will have proven its worth. The contractor-dealer must come into the League. The others should know his problems, know him, and be with him in his efforts to extend electric service.

Mr. Pike Praised the "Electrons"

Mr. M. K. Pike, sales manager and Mr. Wm. Carswell, chief accountant, Northern Electric Company, who spent a week in Vancouver recently, on an annual visit to their western office, were guests on Friday, March 3, at the Vancouver Electric Club luncheon. Mr. Pike told the "electrons" that from what he knew of Vancouver they need not be afraid to tackle the enterprise of an electrical home exhibit. He told them how well the Toronto Electric Home had been handled in January, and what a success it had been in getting the public interest. He warned them that they need not spend too much money to get results. They could find some enterprising real estate man or housebuilder who would provide the building and pay for the wiring. The rest was comparatively easy. He detailed how the electrical industry in Toronto supplied the staff of demonstrators and salesmen each afternoon and evening, to explain and "sell the idea" to the public. Their greatest difficulty was in the limited space they had to handle the crowds to advantage.

Vancouver Electric Club

If Thos. Pearson, member of the provincial legislature of British Columbia, were a poet, he would surely inherit the mantle of Dr. Drummond, for he has all that talented writer's knowledge of and love for the sturdy French-Canadian habitant. Like Dr. Drummond, Mr. Pearson was born in the province of Quebec, and made his home there until ten years ago, when he removed to the Coast. In an address before the Vancouver Electric Club at the weekly luncheon on Friday, 10th March, Mr. Pearson paid a tribute to the worthy character—and characteristics—of the French-Canadian. To live among whom was to respect and love them, he said. From a life-time spent among them, he had observed their thrift, their willingness to work, their kindly and hospitable natures, their loyalty to their leaders. Mr. Pearson gave some amusing reminiscences of political meetings and typical election speeches and election "dodges."

Remodelled Electric Shop in Royal City

Chas. Moulton, New Westminister, has entirely remodelled the interior of his electric shop and has altered his show windows in unique manner. The hardwood floor of the window is removable, and below it at street level a cement floor and walls are exposed, giving the appearance of a basement for the display of electric washing machines, the result being very effective. The interior of the shop has been panelled throughout in laminated wood (a local product) and the panels have been stained in pleasing shades.

Vancouver Electric Service Leaguers have been busy welcoming their secretary-manager, Rey E. Chatfield, and his bride on their return from San Francisco. Mrs. Chatfield was Miss Olive Mills of Alameda, Cal., and the wedding took place at the home of her parents in that city on Feb. 21st.

The month of April is expected to see a new wireless plant in operation at Estevan, on the west coast of Vancouver Island. It is said this will be the most powerful apparatus on the British Columbia coast. At present there is a 5 kw. set, with a normal sending range of 400 to 500 miles, but the new equipment is a 25 kw. set, which will have a day range of 1500 to 2,000 miles and a night range of twice or three times that distance. The new station will be used entirely for ship work, handling messages to and from ships at sea.

A simple description of controllers for electric motors and definitions of the terms used in that connection have been compiled by the Electric Power Club and published in handbook form. Words which do not appear in the regular dictionaries are here explained in simple language and in addition to being a handbook for users of electrical control apparatus, it gives the meaning of terms with which all users of electrical apparatus should be familiar. The handbooks may be obtained from leading U. S. manufacturers of electric power and control apparatus, or from S. N. Clarkson, executive secretary, 1017 Olive St., St. Louis, Mo.

Manufacturers and Jobbers

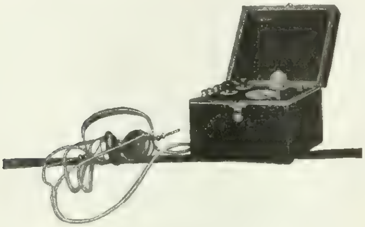
The annual meeting of the Electrical Supply Manufacturers' Association will be held in Toronto on April 6.

The annual meeting of the Electrical Supply Jobbers' Association will be held in Toronto, April 7.

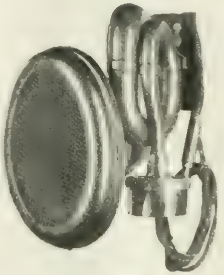
The Latest Developments in Electrical Equipment

New Apparatus for Radio Reception

Another step in the advancement in radio reception has been made through the invention and manufacture of new apparatus by the Westinghouse company, whose nightly programs from its radio telephone broadcasting station, KDKA, are heard by thousands of radio enthusiasts. The new products are the Aeriola, Sr., and the Vocarola. The former is a regenerative receiver and the Vocarola is a reproducing apparatus which serves the purpose of a sound chamber. Through the use of the new apparatus, reception of programs broadcasted by radio telephone will be made comparatively easy. The Aeriola, Sr., is a single circuit tube regenerative receiver. It is contained in a nicely finished wood box with a cover and, as supplied, includes a Brandes head-set and special type WD-11 Vacuum Tube. The oscillating circuit of the receiver of the Aeriola, Sr., is identical with that of the Aeriola, Jr. It consists of a mica condenser of two steps in series with a variometer inductance. The steps of condenser are brought out to two binding posts, the lower capacity being used for wave lengths up to 350 meters, and the higher capacity for wave lengths ranging from 300 to 500 meters. Tuning in between these steps is accomplished by the variometer inductance.


The Aeriola, Sr.

The Vocarola consists of a specially designed metal horn mechanically attached to the mechanism of a single Baldwin telephone receiver. The standard Baldwin mica diaphragm has been replaced by a special metal diaphragm which will stand practically any amount of abuse without damage. A large amount of experimental work was carried on by the radio experts before final decision was made on the horn and it is believed that the design furnishes as fine a quality of reproduction as can be obtained except through the use of a very elaborate sound chamber such as is found in high-priced talking machines.


The Vocarola

The National Association of Cost Accountants, Bush Terminal Building, 130 West 42nd St., New York, has issued a bulletin entitled, "The Scrap Problem." The chief purpose of this booklet is to discuss the methods that may be best used in reducing losses from scrap, with particular reference to plants of some size, in the electrical industry.

Is An Electric Range a Good Investment?

That is perhaps the most important side of the question today to many people who are debating the wisdom of buying an electric range. They are convinced that it is the most desirable method of cooking, but wonder if the first expense of installing is justified.

An Electric Heater

Will solve the heating problem for that extra room.

Heat Your Water With Electricity

Electric Heaters for water tanks are away ahead of any other method Ask any of these dealers to demonstrate the season

Those Who Have Them Say "Wouldn't be Without it at Any Price"

There are scores of Electric Ranges in Kitchener and Waterloo and we have yet to hear of one that has not been satisfactory. The best judges of their value are those who have been using them in their own home and the almost unanimous opinion of the owners is that they wouldn't be without them at any price.

They are economical in fuel, costing much less than either a coal or gas range. There is no dirt, everything is absolutely clean, and all you have to do is to turn the button.

Ask your electrical dealer to give you the name of one of your neighbors who has an electric range, go there and ask for an honest and candid expression of opinion, and almost invariably it will be an enthusiastic appreciation of the electric range from every angle.

ELLIS & HOWARD, LTD
11 Queen St. North Phone 1060

DOERR ELECTRIC CO.,
100 King St West. Phone 214

STAR ELECTRIC CO.
22 Yonng St. Phone 288

C. F. SCHMIDT,
96 King St. East Phone 1953W.

MATTELL & BIERWAGEN
WINDSOR HOUSE BLOCK.
168 King St West Phone 322

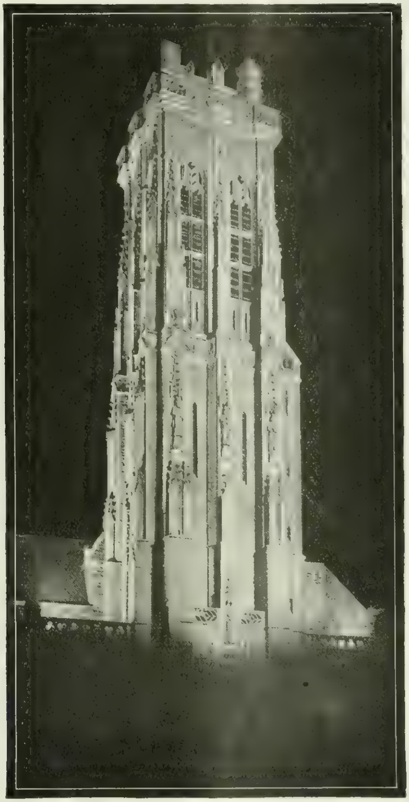
THE ELECTRIC SHOP
King Street, Waterloo. Phone 33

ELECTRIC SERVICE CO
5 King Street, Waterloo Phone 292

This is the way they do advertising in Kitchener. Instead of each of these dealers urging the superior merits of his own machine—to the bewilderment of the reader—they all concentrate on the one idea—the value of any electric range. This advertisement occupied approximately half a page in the local newspaper. Is'nt it a better idea than the average Electrical Page?

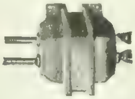
Striking Example of Flood Lighting

The illuminated tower shown herewith is that of Emmanuel Church, Baltimore, Md., the four sides of which were illuminated to a bright intensity on Christmas Eve and Christmas night, last year. This effect was produced by the use of 96 250-watt X-Ray floodlighting lamps, placed in suitably designed reflectors. The floodlights were placed on the roofs of adjacent buildings. This is a new use for floodlights, and suggests a field where the sale of this class of equipment might be largely increased.



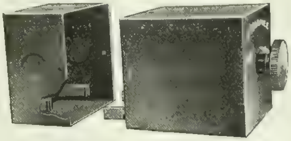
Bell Ringing Transformer

The Canadian General Electric Co. report that they have recently made improvements in the design of their 5 watt, 25 and 60 cycle, household type of bell ringing transformer. In general their steel encased form of transformer is retained but the terminals, both primary and secondary, are made more sturdy and reliable by use of japan impregnated fibre insulating washers securely riveted to the frame with brass eyelets, thus overcoming any possibility of chipping or breaking of insulation under most severe usage. Improvements have been made in insulating the coils by the introduction of horn fibre anchor plates protecting the outside windings on the ends of the coils and also affording a secure anchorage for the primary leads. It is slightly smaller in the new design and with its baked japan finish has a very pleasing appearance. The transformer is designed to withstand an insulation voltage of 2500 volts between primary and secondary windings and also between windings and the case, and each transformer is given this test before leaving the factory as well as a ratio checking test and a capacity test of ringing three bells in multiple. The coils are designed to stand a short circuit test at rated voltage with secondaries closed for 3 hours with a temperature on the casing not to exceed 50 degrees Centigrade rise which means the transformer is not affected by an indefinite short circuit. Comparative tests on these transformers has brought out the fact that in ordinary household service the transformer only draws one third of a watt when contact is made.



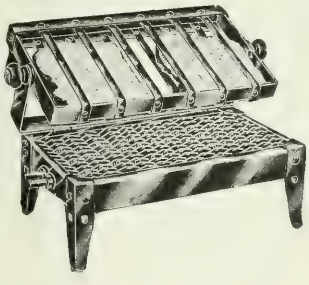
An Economee Switch

The Economee Rheostatic Switch Co., 3551 North Fifth St., Philadelphia, Pa., has recently placed on the market the "Economee" Switch here illustrated. In appearance, it is very similar to the ordinary snap switch; its operation is also the same. However, it differs greatly in operation, i.e., it is a liquid rheostatic switch and the current is applied gradually, the resistance being controlled by a simple timing device. The cutting off of the current is accomplished instantly, as in the usual snap switch. The manufacturer claims that this gradual application of current prevents "starting" troubles in motors, lengthens the life of electric lamps, etc.



Reversible Toaster and Grill

A reversible toaster stove and grill is now on the market, the product of the Triangle Appliance Mfg. Co., 160 N. Wells St., Chicago. Two slices of toast can be made at the same time, then released from the holder and deftly turned onto a plate, without either touching the toast or burning the fingers. The same appliance becomes a grill by simply removing the toaster part of the device.



Electric Railways

Rehabilitation of Toronto's Electric Railway System—V

Buses and Trackless Trolleys—Serving the Outlying Districts at Minimum Capital Cost and Maintenance

The adoption by the Toronto Transportation Commission of gasoline propelled buses and trolley buses for use in certain districts, may be considered as added proof of the fact that there is a distinct field for these types of vehicle. The Commission has been faced with the problem of providing transportation in the less thickly settled areas, and the choice of providing rail or bus facilities,—"mass transportation", as commonly defined, has not entered into the question and the decision of the Commission to use buses and eliminate the heavy cost of track construction is in keeping with a sound policy. That a decision has not been made as to the relative merits of gas bus, gas-electric bus and trackless trolley bus may be adduced from the fact that they are at present operating one or more of each type.

It would be unwise to assume that exact conclusions as to economy and usefulness of bus operation may be drawn from the results of such service in England or foreign countries. The Canadian field has peculiarities of its own; indeed, every district presents a special problem that can not be solved in any "slap dash" fashion, and a cautious policy is to be commended.

Most street railway men will agree that there are certain districts where service is essential, but where the demand is not sufficiently great to warrant the laying of tracks; admitting this as a basic fact, the installation of a service with the least possible investment is desirable and is answered by the use of some form of trackless service. This narrows the question down to the choice of gas, gas-electric or trolley bus, and it is proposed to mention some of the characteristics of each, classing the gas-electric type with the gas bus.

Comparison of Types

Winter weather has always been a bugbear to Canadian operators but in regard to this, one type of vehicle requires about as much attention as another. In the recent heavy weather in Toronto, all bus trips were made on schedule, thanks to the fact that there was an organization to take care of the job, the apparatus was got out early and the routes kept clear. The Commission possesses a specially designed 4-wheel drive tractor, with two ploughs attached, which did great work in snow clearing.

The special advantages of the gas bus include:

(1) Cost of power plant and overhead trolley eliminated.

(2) Greater freedom of mobility. They may operate anywhere that pavements permit.

The trolley bus also eliminates the cost of track and gives freedom of mobility as compared to rail cars. Its use of centralized power generation and its general similarity to rail cars are points that appeal especially to railway men.

The personal equation enters into the question to a certain extent. Some people like to ride on a gas bus simply because it is a gas bus; whether they think they are getting back at the railway for its past sins, or that the upholstery makes them believe they are on a pleasure vehicle, it would be hard to say; the buses of the Toronto Transportation Commission always have a fair percentage on the top deck, smokers of course filling their reserved accommodation.

Maintenance and Depreciation

Every street railway has to carry a large investment in paving and the bus saves this expenditure. Obsolescence is also an extremely high figure in the accounts of a street railway company and it should be considered that a bus service cuts down this item, which is entirely apart from the cost of maintenance and depreciation of tracks, overhead line and power station facilities. When motor buses are used, they may be written off as they become worn out, and the company is not faced with the problem of wiping out a large portion of its investment. For an accurate comparison of cost figures, in the case of the rail cars, a proper a'lowance must be made for depreciation, followed by a correct estimation of obsolescence of track, overhead and power station facilities as well as cars, and the figures thus obtained compared with those relating to the cost of bus operation, which as is apparent, embodies a self-contained power unit and no investment in tracks and overhead line.

In many cases franchise taxes and other imposts for paving, sprinkling, sweeping, etc., now expected of electric railways, are not imposed on bus service. It also should be borne in mind that the idea of a 5-cent fare is not fixed in the mind of the public with regard to bus services, and for this and other reasons previously mentioned, bus service appears to be superior from a merchandising standpoint.

Cost of Operation

No absolutely reliable figures as to cost of operation seem to be available. It is too soon as yet to expect data of that nature from the Toronto Transportation Commission, and the table which is given below is from a United States source;—it relates to trolley bus operation on a typical service involving a fifteen-minute headway with buses weighing approximately 10,000 lbs. Total operating and fixed costs per bus mile are given as 24 cents.

Cost Per Bus Mile of Trolley Bus*

Cost of conducting transportation	7.3 cents
Cost of power	2.5 cents
Maintenance of vehicle	5.0 cents
Maintenance of way and structures	1.05 cents
General and miscellaneous expense	4.0 cents
Road tax	1.0 cent

*Sept. 10, 1921, Electric Railway Journal.

It is a very risky business to go far on such figures as the above for though it is a trite saying that "conditions are different", the fact remains.

The statement that power generated at central stations and transmitted over wires is cheaper than that generated in a self-contained unit must be borne in mind along with the consideration of the cost of feeder lines, crosstown lines and country lines where infrequent headway obtains and with the cost of investment in transmission lines, overhead lines, etc., not lost sight of. Also the cost of generating power in a self-contained unit would be considerably reduced by the introduction of a more economical fuel, of which several varieties are being experimented with at the present time.

Will the Bus force Development?

It would seem that any company operating gas buses or trolley buses must take into consideration the ultimate replacement of these by rail facilities. Canadian cities spread, the average native-born citizen abhors the congestion typical of European cities and gets out somewhere, but the congestion keeps right at his heels. The buses serve him for a while, but experience shows that they tend to force the development of a district; just how far this item should be considered in the installation of buses is a problem that will only be settled by very careful consideration. It might be economy to install a bus service that would very shortly have to be replaced by rail service to secure adequate facilities.

Personnel and Equipment

It is hardly necessary to point out that a great deal depends on the personnel secured, and that thorough training is necessary. The Toronto Transportation Commission has been fortunate in securing some men as bus operators who have had similar experience in England.

The accompanying photographs illustrate the various types of vehicles used by the Commission. The differences are interesting and so far, performance has not been remarkably dissimilar.

It is unfortunate that there is not at present available any entirely Canadian-made bus of proven service. The Veteran is built by a Canadian company but it is the first of its kind. It will be seen that the policy of the Commission has been to buy, if not Canadian, at least, as far as possible, British-made buses.

The London Bus (A. E. C.)

An example of the type of bus which has proved useful abroad is illustrated in the machine acquired by the Commission from the Associated Equipment Company, of London, England. This company build the well known London buses, and the one shown is of the same general construction, with certain modifications necessary to meet the peculiarities of Canadian service. It is motored with a 4-cylinder engine of 35 h.p., which is equipped with Zenith carburetor and the usual pump cooling facilities. The mechanical features include full floating rear axle, 4-speed selective gear box and dual ignition. A 50-gallon gasoline tank is carried. Standard practice of solid tires and cast wheels is followed, as is also the feature of left hand drive which, though necessary to Canadian conditions, is a complete reversal of the English type.

Associated Equipment Co's Bus

Lighting is looked after by a 12-volt Delco system, and heating is from the exhaust. The weight of the bus is 12,000 lbs. Its dimensions are: length, 24 ft. 3½ in.; height, 12 ft. 4 in. As will be noted from the cut, it is of the double deck type (top deck removable) and has an inside front stairway.

The Fifth Avenue Type

At this date the Fifth Avenue Coach Co., New York, N. Y., through the Packard Ontario Motor Co., have supplied the Toronto Transportation Commission with four gas buses, two more being on order. These machines include the single and double deck type, the single deck carrying 29 and the double deck 51 passengers and involving the use of single and two-man crews, depending on the type. Some of the later buses to be supplied are to have the convertible features. As may be seen from the illustration, the buses are designed on the front entrance, pay-as-you-enter idea. The double deck bus is exceptionally low, the total height being 12 ft., "from the ground to the top of a derby hat worn by a 6-ft. man on the top deck."

Fifth Avenue N.Y. type, single deck

The motor is a 4 cylinder special silent sleeve valve type, of 40 h.p., lubricated by means of a force pump. Ignition is from a high tension magneto; the thermo-syphon cooling system is employed, and a special feature is the radiator, so designed that its freezing up would not result in damage. Selective sliding transmission is employed, with four gear changes in forward motion. The drive is of the external gear and plain bevel type. The rear axle is of heat treated forged steel, equipped with steel low level housing, and the front axle is of the I beam type, of heat treated forged steel. The wheels are of the steel disc type, the front ones being equipped with 24 x 5 in. single solid tires, and the rear with 34 x 5 dual solid tires. The service brakes are of the duplex air cooled type, and the bus is also equipped with external contracting cable emergency brakes. Worm and nut steering gear is employed, with the steering wheel located at the left. The gasoline is conveyed to the carburetor by gravity; gasoline tank is of 40 gall. capacity, and is provided with a large demountable strainer and a hand hole for cleaning. The interior is heated by utilizing the hot gases from the motor, these passing through protected radiator coils on their way to the exhaust opening. The interior is provided with artificial illumination by 12 lights, current being supplied by the generator and also by storage batteries.

A Gasoline-Electric Unit

Another bus, which has been acquired by the Commission from Tilling-Stevens Motors, Ltd., Maidstone, Eng., is a gasoline-electric powered unit. A gasoline engine is used to drive a generator which supplies current to an electric motor used for the propulsion of the vehicle, there being no mechanical connection between the engine and the driving mechanism. The design follows automobile practice insofar as that the engine is located in front; it is rated at 45 h.p. and embodies the well recognized principles of water cooling and high tension ignition. Lubrication is automatic, the oil being circulated by a gear pump. The dynamo and motor are carried on two pressed steel frame members. They are built with yokes of high permeability magnet steel and main poles of the customary annealed iron laminations; the armature shafts are of especially sturdy construction and carbon brushes are used. Armature and field coils are tested at a pressure of 2,000 volts a. c. between windings and frame.

The controller and speed regulator are carried in separate aluminum cases. The controller is of the tramway type, with screw adjustment to the contact fingers. The speed regulator is of the multiple contact type, and operates by varying the resistance in the shunt field of the generator, and by shunting the series field of the motor.

The chassis is designed for a maximum load, including body, of 4 tons 10 cwt. for passenger work, or a gross weight of 8 tons 8 cwt. The accompanying illustration shows the bus body construction. The passenger entrance is at the rear, from the right side. The total seating capacity is 48, viz., 22 in the interior, and 26 on top.

A gasoline-electric Bus

It is claimed by the Tilling-Stevens Company that as there is no positive connection between the engine and back axle there is less strain on the working parts and maintenance cost is reduced. Control being obtained by the throttle pedal and electrical field regulation lever, it is said that very easy starting and handling is obtained.

Another English Bus

A gas bus supplied by the Leyland Motors, Ltd., differs essentially from the usual type built by that company (for use in England) in that it was designed to the specifications of the Transportation Commission and represents pioneer work in an attempt to overcome the more arduous Canadian conditions. Its high engine rating of 55 h.p. and feature of single or double convertible deck are innovations in Leyland design. The machine has a capacity of 59 passengers and will carry a substantial overload. It is equipped with special auxiliary shock absorbing springs, dual ignition and has a high ground clearance. The convertible feature allows of its use as either a one-man or two-man bus, in regard to which it will be seen that the stairs are just behind the driver.

Leyland Bus to special specifications

The engine is, perhaps, the most interesting feature of this bus; it is the same type as used in the standard Leyland motor fire engine. Some features of its construction are: aluminum crank case; extra long water jacket; aluminum pistons; composite valves; centrifugal water pump; main gear oil pump; auxiliary pump and Zenith carburetor. An aluminum cone clutch, fabric faced, is used and the gears permit of four changes of speed.

The Leyland bus is being operated at present on the Mount Pleasant Road run, in the northern part of the city.

A Pierce-Arrow Bus to be used in Rosedale section, in N.E. Toronto

The Pierce-Arrow Product

The Pierce-Arrow Company have been turning out buses for some time and one of these is included among the recent orders of the Commission

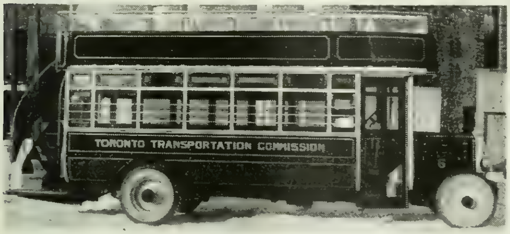
The machine is equipped with a dual-valved, 4 cylinder engine which will develop 46 h.p., a Stromberg carburetor is used and ignition is by the Delco system, with 2 sets of spark plugs. The length inside the floor is 17 ft. 19½ in. and height from floor to ceiling is 6 ft. 2½ in. Twenty-five passengers are carried.

Several design innovations are present; these include the use of a cushion wheel with semi-pneumatic tire; a special steel window casing which does not wear loose, and an ingenious seating arrangement. The illustrated machine differs slightly in wheels, body, steps and painting from the one ordered by the Commission. It is claimed by the Pierce-Arrow Company that one of these buses has averaged better than 11 miles per gallon.

The body of the machine is being built in Canada and it is expected to be in operation by April 1st. It will be used in the Rosedale district of Toronto, from the end of the Church Street car line.

One of them Made-in-Canada

One of the buses purchased by the Transportation Commission has been made in Canada. This order was given to the Eastern Canada Motor Truck Company, Ltd., of Hull, Que., and the bus itself has been named "The Veteran," doubtless having in mind that Messrs. Bell & MacDowell are veterans of the late war, the former, Capt. G. G. Bell, D.F.C., Legion of Honor, and Croix de Guerre, and the latter, Maj. T. W. MacDowell, V.C., D.S.O.

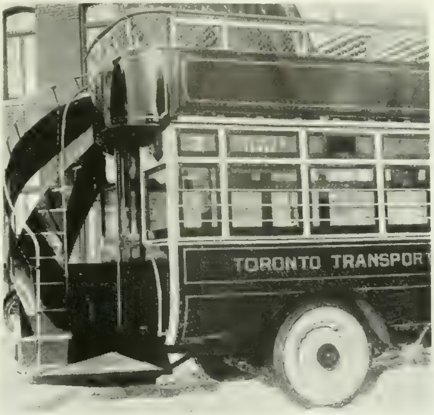


The "Veteran"—Made in Hull, Que.

The chassis of this bus is specially designed for bus service; it is under slung, with drop frame—floor level 27 inches from ground; wheel base 174 inches. This combination of low centre of gravity and long wheel base is a valuable feature in double deck buses.

The motor is a Buda transmission, constant mesh type, which facilitates the changing of gears; radiator cooling system, thermostatic. The wheels are cushion type, with demountable rims. Body, wood and steel construction; standard red color, gold leaf striping; interior, mahogany, with rattan seats. Ventilators draw air through grids in agasote ceiling. "Perfection" exhaust heaters are used, the body being lined throughout and specially constructed for Canadian winters. The windows are drop type and provided with curtains. All fittings, such as seat handles and railings are brass.

Interior of "Veteran."



Rear entrance of "Veteran" Inside passengers leave by front door

A unique feature of this bus is the front door exit, enabling full load of 51 passsengers—30 upstairs and 21 inside—to be unloaded in half the regular time; the operators report that a full load has been discharged in 30 seconds. There are two steps at the entrance, (all enter at rear) one to platform and the second to enter the lower section of the car.

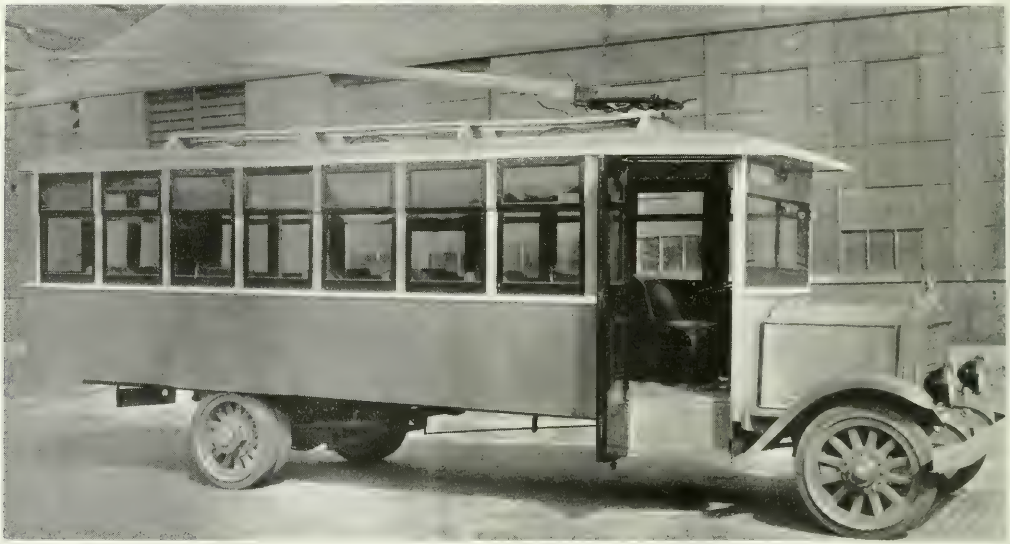
Trolley Buses

Trolley buses are also being given a thorough try-out by the Toronto Transportation Commission. The four thus far ordered have a chassis of standard Packard design, with such changes as are necessary to accommodate electrical instead of gasoline equipment. The body is of metal frame construction, the lower side and rear of car of ply-metal and the roof of water-proof veneer, sufficiently strong to carry a man. At the bottom of body at chassis frame the overall length is 20 ft. 7 in.; the width over posts outside is 7 ft. 4 in., and the height from top of floor to under side of ceiling is 6 ft. 2 in. Complete with motors, control apparatus and resistor, the chassis weighs 7,190 lb., there being an almost equal distribution of weight on the front and rear axles. The wheels are equipped with single solid tires in front and double solid tires at the rear. The buses are built with one double outward folding door on the right, in front, with wire plate glass in the lower section so that the driver can see that the step is clear; it is operated pneumatically, by a hand lever at the left of the driver. An emergency door is provided at the left side, near the rear, and is controlled by an electric lock in such a way that the breaking of a glass will automatically cause the lock to operate.

A stanchion, extending from floor to ceiling, is located at the rear end, and a similar one just inside the door at the front, to assist passengers in entering and leaving. A mirror is placed in the interior so that the driver can see the rear. Provision is made for route signs and advertising space. Adequate heating arrangements are made by the installation of six Cutler-Hammer, 500 watt, 286 volt, single unit truss plank heaters, two units in series, the wiring of which is installed in conduit, as is also that of the lighting circuits.

The two motors which are used are interchangeable and are duplicates of those in the safety cars at present operating in Toronto; they are connected through a universal joint to the automobile type of differential in the rear axle. They are rated at 25 h.p., 37 amps., at 600 volts.

The control is to be of the automatic series parallel type, having four notches in the series position, and three in the parallel. The first notch in the series position is independent of the accelerating device, so that very slow running is had for emergency use in slow traffic. All other notches are under the control of a time element current limit. The action of this acceleration limiting apparatus provides a minimum time element for complete operation of the sequence switch when no current is flowing through the main motors. With current in the main motors, the speed of operation is approximately inversely proportioned to this current. Three operating positions of the master controller are provided for "starting," "full series," and "full parallel." The last two notches are running ones. Operation of the control apparatus is by a foot pedal for normal running. Reversal of running direction is by a switch type reverser, controlled by a lever which interlocks with the main operating pedal.



On the Mount Pleasant line Toronto will have the first Trolley Buses on this Continent

The control apparatus includes one set of six magnetically operated switches with control resister and sequence relay, one foot operated master control, one motor field reverser, one double pole, magnetically operated line switch with overload relay, one automatic time element sequence switch, one motor cutout switch and one set of grid resistance. All of the control apparatus is mounted beneath the usual engine hood, the resistors, control resistance, reverser and master controller being mounted on one side of the panel.

The power supply for the control circuits is obtained from the main supply circuit, and is reduced to the proper operating voltage by a control resistor. By the use of this control resistor, all but two of the control circuits are at low potential, tending to provide more reliable operation of the control apparatus on account of the less liability of insulation breakdown. Overload protection is obtained by a two pole, single magnet, coil-operated line switch, mounted with an overload trip. This switch is also used to close or open the main circuits each time the master controller is moved to "on" or "off" positions. This switch is mounted adjacent to the contactors on the central carrier, and an operating lever is brought through the dash for closing or tripping the switch.

The proper sequence of switches is obtained by a single drum master controller which is mounted under the hood and operated by a foot lever. A two-pole snap-switch, complete with fuses, is supplied for opening the control circuits for inspecting or repairing, and is mounted on the dash board.

A motor operated drum switch is used to obtain a time element current limit acceleration of the control equipment. This switch constitutes a secondary master switch for limiting acceleration of the vehicle, and is in turn controlled by the master controller. The speed of the drum of this sequence switch is limited by the current in the main motor circuits. However, the drum continues to move, although at slow speed until the full parallel position is reached, if the main motors do not accelerate. The sequence switch, therefore, provides for acceleration on heavy grades or with heavy loads.

A three pole double throw switch, similar in construction to the reverser, is furnished to cut out either of the two main motors. For collection of current, one No. 13 U.S. trolley base complete, with 16 ft. pole, swivel harp and 4 in. wheels is supplied. This single pole is equipped with two shoes, and an equalizing spring serves to maintain contact with both the positive and negative wires despite irregularities and differences in elevation as between the two wires.

W. M. Preston of Simcoe, Ont., has taken over the electrical contracting, plumbing & heating business of J. H. Madden, Norfolk Street, Simcoe, Ont.

Current News and Notes

Brantford, Ont.

Officials of the General Hospital, Brantford, Ont., are considering the installation of an auxiliary lighting plant. The recent sleet storm, which damaged transmission lines and left that city in darkness, brought out the necessity of some plan whereby electric light, at least, might be obtained in cases of this kind.

Brockville, Ont.

Messrs. A. G. Dobbie & Co., King St. W., Brockville, Ont., have been awarded the electrical contract by Mr. C. S. Cossitt, Brockville, on his stores on King St., now undergoing alterations.

Copper Cliff, Ont.

Mr. Percy Morrison, Sudbury, Ont., has been awarded the contract for electrical work on a new school to be erected at Copper Cliff, Ont., at an estimated cost $110,000.

Edmonton, Alta.

The Hillas Electric Company, 10041 Jasper Avenue, Edmonton, Alta., has been awarded the contract for electrical work on a Home for the feeble minded to be erected at Oliver station at an approximate cost of $120,000.

Forestburg, Alta.

Mr. N. K. Lund, Forestburg, Alta., contemplates the installation of an electric lighting plant, at Forestburg, in the near future.

Goderich, Ont.

The Water & Light Commission, Goderich, Ont., contemplates replacing the electric transmission lines on West and Waterloo Streets with heavier wires on account of overload.

Hamilton, Ont.

The Hamilton Street Railway Co., Hamilton, Ont., are now charging a straight five cent fare, the result of an agreement with the Hamilton city council. This provision may be withdrawn at any time by the council.

Hull, Que.

Mr. Ephrem Labelle, 9 Labelle St., Hull, Que., has been awarded the contract for electrical work on a store and residence recently erected at 13 and 15 Youville St., Hull, by Mr. J. Baillot, 32 Amherst St.

Kitchener, Ont.

The announcement is made that preparations for the Electric Show, to be held in Kitchener during the first week of May, are already well advanced and that considerable space has been subscribed for by manufacturers of electrical equipment.

Meaford. Ont.

The town council of Meaford, Ont., recently passed a resolution authorizing the town clerk to submit an offer of $12,000 to the Georgian Bay Power Company, Meaford, for its power plant, equipment, distribution lines, etc.

Monction, N. B.

The Canada Gazette announces the incorporation of the Johnston Company, Ltd., with a capilization of $49,000. The new organization will take over the electrical contracting and plumbing business formerly carried on by the Thomas Johnston Company, Moncton, N. B. The head office of the company will be at Moncton.

Montreal, Que.

Mr. J. J. Valois 444 Durocher St., Montreal, has secured the contract for electrical fixtures and wiring on the Harvard Apartments being erected at 5628 Sherbrooke Ave., Montreal, at an estimated cost of $80,000, for Dr. G. A. Belanger, 21 St. Famille St.

Messrs. J. A. Anderson & Co., 205 Mansfield St., Montreal, has secured the contract for electrical work on a warehouse at 30 St. Helen St., Montreal, that is undergoing alterations.

Mr. H. R. Cassiday, 255 Regent St., Montreal, has secured the contract for electrical work on stores recently erected at Park & Pine Avenues, Montreal, at an approximate cost of $26,000, the property of the J. H. Peck Estate.

Niagara Falls, Ont.

Work has been commenced on a transformer station at South St. & Victoria Avenue, Niagara Falls, Ont., being erected by the Niagara Falls Hydro-electric System, at an estimated cost of $125.000.

Penticton, B. C.

The Penticton Electric Company, Penticton, B. C., has been awarded the contract for a motor pump and equipment, for use in irrigation work at Ellis Creek & Skaka Lake Flats, British Columbia, by the city of Penticton.

Seaforth, Ont.

Reid Brothers,of Seaforth, Ont., have recently installed an Electrion isolated lighting outfit on the farm of Robert Campbell, who is one of the most up-to-date farmers in South Western Ontario. Mr. Campbell is reported to be very enthusiastic over his new installation. This is the second plant Reid Brothers have recently installed.

St. John, N. B.

The Webb Electric Company, 91 Germain St., St. John, has been awarded the electrical contract on a recreation hall to be erected on Prince Street, St. John, by the New Brunswick Division of the Red Cross Society.

Toronto, Ont.

Mr. J. E. Harman, 42 Arundel Ave., Toronto, has been awarded the contract for electrical work on four store buildings recently erected on Danforth Ave., for J. H. Rooke, 4 Playter Crescent, Toronto.

The Toronto Transportation Commission recently purchased the office building of the Security Life Insurance Co., at 37 Yonge St., Toronto, and are having it renovated for head office purposes.

Mr. W. J. Crone, 27 Sparkhall Ave., Toronto, has been awarded the electrical contract on a store and apartments building being erected at 1999 Danforth Ave., Toronto, by Mr. E. Dodson, 684 Woodbine Ave.

Mr. Geo. O. Lee, 6 Howard St., Toronto, has been awarded the contract for electrical work on two stores recently erected on St. Clair Ave., near Northcliffe, Toronto, for David Lavine, 71 Gloucester St.

Vancouver, B. C.

The Jenkins Electric Company, 539 Main St., Vancouver, has secured the contract for electrical work on a warehouse to be erected at 168 Water St., Vancouver, by the J. Leckie Co., Ltd., of that city.

The Jarvis Electric Co., 570 Richards St., Vancouver, have secured the contract for electrical work on a building, located at 445 Richards St., Vancouver, owned by Mr. J. H. Roaf, 1285 Harwood St., that is undergoing repairs.

Verdun, Que.

Mr. E. Robillard, 1346 St. Joseph St., Verdun, Que., has been awarded the contract for electrical work on a store building recently erected on Wellington St., Verdon, for Mr. A. Cuerrier, 1342 Wellington St.

Vernon, B. C.

At a meeting of the local civic power committee, held on March 8, it was decided that a preliminary report be obtained on the cost of installing a power plant at Shuswap Falls, and building a transmission line into the city. Messrs. Yuill & Knight will make the report. This power plant is one of a number of alternatives discussed at the meeting, which included a development on the Adams River; an offer from the Kootenay Light & Power Company, and also the advisability of adding another unit to the present plant. Mr. Excell, superintendent, stated that the present equipment is operating to capacity, with no opportunity for overhauling, and urged the necessity for early action in relieving this situation.

Wellington, Ont

The Canada Electric Co., 175 King St. E., Toronto, has been awarded the contract for electrical wiring on a consolidated school being erected at Wellington, Ont., at an estimated cost of $115,000.

Windsor, Ont.

A report states that the city council of Windsor, Ont., is considering a plan whereby householders may be assisted in the purchase of electric ranges, etc.

Winnipeg, Man.

The Canadian General Electric Company, Winnipeg, have been awarded the contract, by the city of Winnipeg, for a number of automatic induction regulators.

The Canadian Westinghouse Company, Ltd., Winnipeg, have been awarded the contract, by the city of Winnipeg, for the supply of a number of pole type transformers.

The Moloney Electric Company of Canada, Ltd., Toronto, have secured the contract for thirty 37½ kw., one 100 kw., and three 75 kw. pole type transformers, for the city of Winnipeg.

Mr. S. H. Wilson, Curry Building, Winnipeg, Man., has secured the contract for electrical work on a building, owned by Messrs. Peace & Co., at 260 Portage Ave., Winnipeg, that is undergoing repairs.

District Branch in Guelph

A Distrct Branch of the Ontario Association of Electrical Contractors & Dealers has been formed at Guelph. At a meeting held on Friday, March 10, Mr. V. K. Stalford, of Hamilton, was present and assisted in the formation of the Branch. The following officers were elected: Mr. W. W. Stuart, chairman; Mr. R. Christie, Mr. F. Martin, Executive Committeemen; Mr. George B. Grinyer, secretary-treasurer; Mr. W. W. Stuart, representative on the provincial executive.

It is reported that the membership of this district is 100 per cent. At the inaugural meeting all themembers were present and at the close of the business proceedings, which were marked by great enthusiasm, the members dined together.

Montreal "Home" a Great Success

The results of the Montreal Modern Electrical Home are regarded as satisfactory by the organizers of the campaign. The results of the other houses which will be opened are expected to exceed those already obtained, owing to the cumulative effects of the movement. One building company, which will construct fifteen houses this season, has agreed to wire them according to specifications supplied by the Electrical Cooperative Association of the Province of Quebec. Signs to this effect will be placed on the houses during construction. A committee, consisting of two contractor-dealers, an electrical engineer, and an architect, will prepare plans and specifications for wiring houses.

A folder, entitled "Simplicity Fuses" has just been issued by the Cote Bros. Mfg. Corporation, Chicago, describing the new refillable fuse of that name, whose outstanding characteristic is its simplicity. This fuse consists of only two parts and the tiny refill cartridge. The salient features are safety from shock while refilling, great economy, and consistent operation over a long life.

The Electrical Equipment Company, of Johnstown, Pa., announce that S. R. Burd has been appointed acting sales manager of the company, to succeed H. A. Selah.

Curling Electrically

On March 9th & 10th, the Manitoba Electrical Association put on a very successful curling tournament, which was held at the Granite Rink, Winnipeg, fourteen rinks taking part in this annual affair. Winnipeg Hydro presented a fine Silver Cup to be held for a period of one year by the winners, who are as follows:—Messrs. G. White, J. Steinhoff, G. Newman and J. C. Munro, skip. The runners up were Messrs. H. C. Howard, R. D. Smith, F. J. Malby, and J. R. Aikman, skip. After a very exciting finish for the consolation event, J. M. Russell's rink, which was made up of Messrs. A. Esling, J. Swan, E. V. Caton, and J. M. Russell, skip, won out with a score of eight to seven over J. E. Lowry's rink, which was composed of H. Smith, H. Allan, F. Filer and J. E. Lowry, skip. The prizes were presented to the winners by L. M. Cochrane of Cochrane, Stephenson & Co., Ltd., at the fortnightly luncheon, held on the 23rd of March. The prizes were generously donated by various members of the Manitoba Electrical Association.

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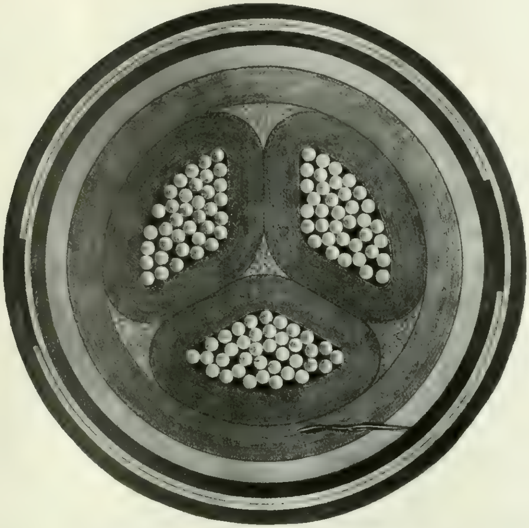

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CANADA'S MINERAL PRODUCTION

The Dominion Bureau of Statistics has published a preliminary report on the mineral production of Canada, which shows that the economic minerals produced during the calendar year 1921 reached a total value of $172,327,580, as compared with $237,422,857 for the preceding year. The report was prepared under the direction of Mr. S. J. Cook, chief of mining, metallurgical and chemical branch of the bureau.

By classes the value of the mineral production during the year comprised metallics, $52,580,000; non - metallics, $89,405,000, and structural materials and clay products, $30,342,000.

The principal mineral producing province according to the returns for 1921, was Ontario, the mineral output from this province being valued at $54,505,770. British Columbia came second with a mineral production worth nearly $35,000,000. Nova Scotia was a close third with $32,500,000; Alberta ranked fourth with $29,000,000; Quebec was fifth with $14,600,000, and Manitoba, Yukon Territory, New Brunswick and Saskatchewan followed in the order named with productions between one and two million dollars each.

The ten principal products of the mineral industries of Canada in 1921, arranged in order of value were, coal, $74,273,000; gold, $21,327,000; silver, $9,185,000; copper, $7,459,000; nickel, $6,752,000; natural gas, $4,902,000; asbestos, $4,807,000; lead, $3,855,000; zinc, $2,758,000, and gypsum, $1,726,000.

LARGE HOTEL PLANNED

Plans for the world's largest hotel, to contain 3,000 guest rooms and to be built on Michigan Boulevard, Chicago, at a cost of more than $12,000,000, were announced recently. It will be 25 storeys high.

The announcement followed the sale of a block of land for $2,500,000, on which the new hotel, to be known as the Stevens, will be built. Construction, it was said, will start soon after May 1. The announcement was made by James W. Stevens, president of the Lasalle Hotel Company.

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52 h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
50 h.p.,	3 ph.,	60 cyl.,	550 volts,	970 r.p.m
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
20 h.p.,	3 ph.,	25 cyl.,	550 volts,	710 r.p.m.
15 h.p.,	3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	220 volts,	720 r.p.m.
15 h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
13 h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
7½ h.p.,	3 ph.,	25 cyl.,	550 volts,	1450 r.p.m
7½ h.p.,	3 ph.,	25 cyl.,	550 volts,	725 r.p.m.
7½ h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1425 r.p.m.
2 h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
1 h.p.,	3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½ h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
¼ h.p.,	1 ph.,	60 cyl.,	110 volts,	1700 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6 h.p.,	1 ph.,	60 cyl.,	110 volts,	1150 r.p.m.

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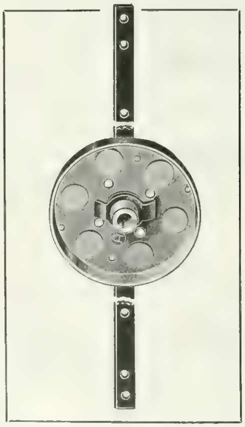

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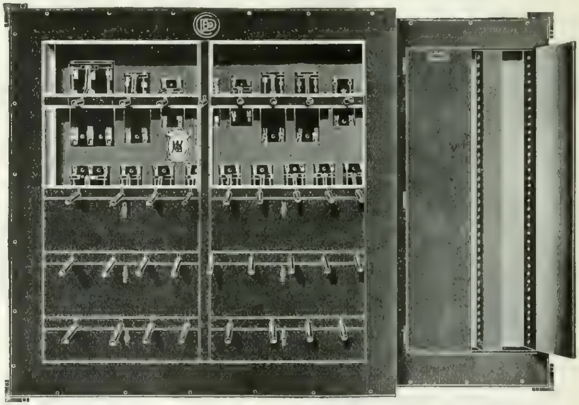

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Generation, Transmission and Application of Electricity

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The Prime Need of the Electrical Industry in the Prairie Provinces Is—Organization

"The West" has always had a fascination for Canadians. It has always been characterized by so much vigor, so much optimism and, as a logical sequence, so much progressive development, that the whole continent has looked upon the "Last Great West" with envy and admiration.

It must not be supposed for a moment, however, that western progress has, in any sense, been a matter of chance. Of course, they had wonderful natural resources but, along with these, they had tremendous obstacles to overcome. The real cause of success has been their ability to "come back" in spite of all the hard knocks—the sportsman-like tenacity with which they have held on, worn out the opposing forces and finally won the game. The spirit of the real sportsman is, and has always been, the spirit of the West.

The West had, and has, wonderful natural resources and is turning them to good account. We in the electrical industry are more especially interested in the development of power and the extent of its application. For that reason we devote this issue entirely to a discussion of the various developments that have taken place in the three prairie provinces along the different electrical lines—telephones, power plants, railways, merchandising, and organization. The information we are able to place before our readers will be found not only interesting but highly educative.

Speaking generally, the prairie provinces are not blessed with a very ample supply of water power. In this statement we must, of course, except that part of Manitoba which lies within transmission distance of the falls on the Winnipeg River—the power development in the Winnipeg district bids fair to become second only to the Niagara and the Montreal areas. But in the western section of Manitoba, in Saskatchewan and in Alberta—especially the southern portions of these provinces—the supply is far below the demand. As a compensation, however, there is coal of a fair quality—in abundance in Alberta and to a less extent in Saskatchewan. There is also crude oil and gas. All these are, therefore, playing a part in the western power development scheme.

Another outstanding feature of the western power situation is the wide distribution of small isolated farm plants. The number of these has been variously estimated from five thousand to ten thousand. They are the natural result of a shortage of water power, with the accompanying network of distribution lines and just another example of western resourcefulness.

In making a close study of western conditions, as we have been doing during the past two months in the preparation of this issue, there are certain phases that have obtruded themselves and certain suggestions we should like to make that, we think, would be for the betterment of the industry. One thing that has been emphasized time and again is the lack of general organization. The reason, we believe, is clear—the great distance between towns and cities—but the need is very urgent. There is no central station organization, no electrical engineering society, no contractors' or dealers' association such as we find in the older provinces and which have done much to hold the industry together and direct the development along right lines. The central station need could best be met, we think, by the formation of provincial associations that would tie in with similar associations in Ontario and Quebec. The same scheme would also seem to be workable for the contractors and dealers. Ontario is organized by districts, each district having its local association and executive and electing one representative to a provincial executive. If the western provinces would organize along similar lines—which seems to be the most logical scheme—there could then be formed a Do-

Card of Thanks

The work falling directly upon the publishers in the preparation of this special issue has been greatly lessened by the splendid assistance and co-operation from the various electrical interests. To the numerous contributors, to the officials of power companies and municipal plants, to the manufacturers, jobbers and dealers, to our Western Editor, Mr. E. H. Chapman, and to all others who assisted, we extend our warmest thanks.

Owing to lack of space, it is necessary to hold over several special articles for another issue.

The Publishers

minion executive, made up from the various provincial executives. Organization of some kind, however, seems necessary for a continued economic development.

The other need that stands out prominently is for standardization of equipment and methods of installing it. Ontario follows regulations laid down by the Hydro Commission; Quebec follows the Underwriters' rules. The West in this respect is very much disorganized; the matter is left in the hands of individual inspectors who, with the best intentions and ability in the world, but because they are working independently of one another, do not arrive at the same conclusion. This lack of standards is a handicap to everybody and is undoubtedly retarding general progress.

We venture to suggest that if these two problems could meet an early solution the effect would immediately be noticeable in more harmonious and economical development all along the line.

Western Electrical Men Strongly Favor Standard Specifications for All Canada.

The question of standard rules and regulations regarding requirements in the way of electrical material and equipment, as noted in our last issue, has been receiving a very considerable attention recently from a number of Canadian electrical bodies. The prairie provinces are perhaps more interested in this question than any other section of the Dominion, inasmuch as there is an entire lack of standardization. The viewpoint of the prairies is thus of special interest at this time and we reproduce below extracts from letters from representative men in the manufacturing, jobbing, and central station sections of the industry. The present moment is opportune for a discussion of the subject by electrical men from coast to coast.

Consumer has no Protection

"I understand that the Electrical News favors a movement for the establishment in Canada of an official central Inspection Bureau similar to the Underwriters' Laboratories of Chicago, but with extended powers to dictate the class and design of electrical material and equipment to be used in this country. An effort of this kind on the part of your publication is a most praiseworthy one, and I believe will receive the hearty support of every Canadian interested in the electrical business.

"There is no question that if a device is unsuitable for use in Ontario, it is equally unsuitable for use under the same conditions in any other Province. This condition does not now prevail. Equipment that can be used in British Columbia may not be suitable for Ontario. Equipment suitable for Ontario may not be suitable for use in Winnipeg. Under these conditions, the manufacturer must consider the regulations prevailing in different localities naturally giving precedence to that from which the largest volume of business is obtainable. The jobber is faced with the same problem, and the situation as a whole is basicly anything but economical.

"At present the consumer has really no protection against buying electrical devices that are dangerous and practically worthless. While the local rulings may forbid the sale of any particular design of device, it is almost impossible for the local inspector to prevent these devices getting into the hands of users. If an official central Inspection Bureau with the proper Federal Government control were instituted, all approved appliances and supplies would bear the official label, and in this way a uniform and proper standard would be established."

Industry Getting Nowhere

"I feel that the time has arrived for action to be taken by the entire electrical industry in the Dominion, particularly the manufacturers, toward the establishment in the Dominion of a centralized Inspection and Approval Bureau.

"At the present time local wiring inspectors have placed on their shoulders the entire responsibility for the acceptance or rejection of practically all electrical products, and from time to time the manufacturer is called upon to change design of product, (and sometimes this is very costly) to meet the requirements of a local inspector, and whi'st the product when fully changed to conform to the inspector's requirements may do very nicely for the territory in which the inspector is operating, the same product may not conform to the ideas of an inspector located in some other centre.

"With conditions as they are at present you can plainly see that methods in use are not getting the industry anywhere; consequently we are more or less working an "endless chain" proposition.

"Some of the wiring inspectors in Western Canada recognize the inspection and approval service of the Underwriters' Laboratories of Chicago, and will accept in their given territories electrical material approved by this body. On the other hand, there are inspectors who absolutely refuse to be bound by the rulings of the Underwriters' Laboratories, and consequently reserve the right to set up their own particular specifications, which are placed before the manufacturer for him to follow, regardless of the cost.

"I do not wish to give the impression that local wiring inspectors are to be criticized for the work they are doing. In fact, I think the industry at large is more to be criticized for not having taken steps some long time ago toward the establishment of a centralized Inspection Bureau, whose rulings and inspection service would be accepted by the Fire Underwriters, wiring inspectors and others interested, and consequently products that have passed through the hands of such an Inspection Bureau would be saleable throughout the entire Dominion, from Halifax to Vancouver.

"In conclusion, I am of the opinion the majority of the wiring inspectors located in the Dominion of Canada would welcome a move toward the establishement of an organization such as I have referred to."

Great Inconvenience

"With regard to the establishing of a Board centralizing the inspection of electrical material as per your editorial.

"We feel that there is a great deal of room for improvement over the present system of inspection and approval of various manufactured lines.

"In many cases in the past few years articles have been bought by us in good faith, which were approved by the Fire Underwriters in both the United States and Canada, and also passed the Hydro inspection in Ontario, and yet were not approved in certain sections of the Prairies.

"Another thought that enters in here is the fact that west of Winnipeg there is practically no inspection. A great many times the articles inspected and passed by the local Winnipeg inspector, for example, is a higher grade

(Continued on page 119)

Conditions in the West Are Improving

Emerging from Seven Critical Years of Hardship — Looking to the Future with Confidence — Winnipeg Municipal Affairs — Electric Railway Situation

By J. G. GLASSCO

The last seven years have been critical ones for the publicly owned utilities of Western Canada. In such places as Edmonton, Saskatoon and Regina, where coal is used as fuel, the hardships have been particularly severe. In addition to being seriously affected by the price of fuel, such places were still further handicapped on account of the fact that the major portion of the expense of running a steam utility is in the operating and maintenance costs. Hence, the soaring of all commodities and labor tended to accentuate a situation which has been aggravated by the large rise in fuel costs.

With those plants, such as Winnipeg and Calgary, that have water power, the conditions were not so bad, since the large percentage of their annual expenses are represented in fixed charges, and these did not vary.

In all places, however, where electric railway utilities were operated the high labor and material costs made satisfactory financial results impossible. Although in some cases tramway fares were largely increased to offset these conditions it is only now that the tram utilities are beginning to make two ends meet.

1920 saw the peak of labor and material costs, 1921 showing gradual decreases all around. In fact in Edmonton in 1921 the different utilities, all operated by the city,

Winnipeg's Hydro Manager

Mr. John G. Glassco, manager Winnipeg Hydro-electric System, was born at Hamilton, Ont., in 1879 and was educated at the Public and High Schools in Hamilton, and at McGill University, Montreal, graduating with the Master of Science degree in electrical engineering. He was at first in the employ of the Montreal Light, Heat & Power Company, in 1900, but subsequently returned to the university as demonstrator and lecturer. In 1903 he went to Los Angeles, California, as superintendent of Meter and Repair Departments of the Southern California Edison Company. In 1905 he was appointed chief engineer of the Dominion Power & Transmission Company, Hamilton, Ont., and held this position until he moved to Winnipeg in 1909, as chief electrical engineer of the power construction work of the city of Winnipeg. He was appointed power engineer in 1911, in 1912 became manager of the Hydro-electric System and has occupied this position since that date. In the interval he has witnessed the growth and development of the system into a concern of which the assets exceed fifteen million dollars and where the amount of energy generated last year exceeded one hundred and twenty-five million kilowatt hours. Mr. Glassco is a member of the Engineering Institute of Canada, the American Institute of Electrical Engineers, Manitoba Club, St. Charles Country Club, Pine Ridge Golf Club and Old Colony Club. He is a consistent and enthusiastic supporter of every movement that is working for the development of the electrical industry.

showed a surplus of $251,986.00, whereas in 1920 there was a deficit of $94,867.00. The loss on the Edmonton Street Railway in 1920 slightly exceeded $200,000.00, and this was reduced to $47,795.00 in 1921. Saskatoon reports the same improvement as in Edmonton, in each case the Railway Utility being the laggard. This, of course, is to be expected as a Railway Utility's operating expense accounts for a much larger percentage of gross earnings than those of a light and power utility.

Winnipeg Hydro Extending

For the first time in nine years the Winnipeg Municipal Plant shows a deficit. This can be accounted for by the heavy financial charges which the plant has had to carry as an additional burden on the hydro extension which has been completed and which has doubled the available electrical supply from our water power plant. The fixed charges on this extension approximated no less than 20 per cent. of our total annual expenses last year. It will readily be understood that the relatively high interest rates on the money raised during 1920 and 1921 contributed to this heavy overhead expense. The deficit was a small one of some $27,000. and in no sense materially affects the financial standing of the plant, since we carry forward a credit balance to Profit and Loss of $233,000.00, on operating account.

The Depreciation Reserve now has reached two million dollars in addition to the investment with the Sinking Fund Trustees which exceeds one million dollars, and the question arises as to how far the city is justified in increasing this reserve fund. The physical condition of the plant has been maintained at a very high standard, and some of our friendly critics claim that now with adequate reserves, which should be maintained at their present figure but not increased, further levies should be discontinued and should be applied to the reduction of rates. It is questionable, however, whether the time has arrived for a reduction in rates that are already undeniably low and which are the only thing in Western Canada that has not been increased during the last six years.

Merchandising Policy

Another problem which has caused us a good deal of concern is the opposition that has developed on the part of some of the electrical dealers in Winnipeg to our merchandising department. We do not think this opposition is justified. Ninety per cent. of all large central stations in America are in this merchandising game and it is generally recognized now that the central station has an important and a prime function to perform in the matter of stimulating the sale of electrical appliances. Of course the difficulty arises through the difference in objectives between the central station and the dealers. In the case of the former, the prime motive is to increase the sale of electricity, whereas with the dealers their living and whole existence depends on a reasonable profit from the sale of these appliances. If, however, the central station plays the game squarely and maintains prices which will show all dealers a reasonable profit, then there should be no opposition to the central station, which, as a rule, bears a large share of advertising and which also performs the very important function of servicing and looking after customers' complaints. We have reason to believe that the opposition that developed last year in Winnipeg is gradually being overcome and that harmony and co-operative measures will obtain during the coming year.

The plant now has a surplus of 30,000 h.p., to which can be added in twelve months another 30,000 h.p. by the installation of five additional units. It should be noted that the transmission line and all switching in the generating station have been completed for the full complement of 100,000 h.p. development.

Survey work has also been started on the city's additional site at Slave Falls, and if, as expected, prosperous times come quickly to Western Canada, construction work on this site will be started within the next couple of years.

In spite of the business depression and unsatisfactory reports from commercial houses, our earnings have not only been maintained but show a healthy increase each year, the increased revenue coming from the domestic customers, with whom we have popularized electric ranges and water heaters. The power business is barely holding its own, while the commercial lighting revenue shows a small increase.

Looking to the future as we do with confidence the question arises in our minds as to whether Winnipeg, or, rather, Manitoba, will be able readily to absorb the large surplus energy which is now on hand in our case and which will be very much augmented when the new plant of the Manitoba Power Company is put into operation. This plant is expected to be completed in 1923, with an ultimate capacity of 170,000 h.p., which will bring the total power available from both plants in Winnipeg to the large figure of 300,000 h.p. According to statistics supplied by the Federal Government, Water Power Branch, in 1919, Winnipeg will not require this amount of power until 1945, but this estimate is considered to be a very conservative one, and if it is possible to induce large manufacturing establishments to locate in Manitoba, or if any progress is made in the development and use of electric power for our newly discovered mining area, even such a large amount of power should be readily absorbed. Winnipeg, itself, cannot be expected to take more than a fraction of this large surplus.

Taxes and Capital

Opponents of capital must learn that enactment of a high progressive surtax in the income tax law was like the victory of Pyrrhus. Beginning at $5000, the rate increases until it becomes confiscatory for large incomes. If a man invests in a productive enterprise and receives an income of $500,000, the government takes $303,190 of it. If he earns $1,000,000, he can retain only $336,810. Should he earn $2,000,000, the government would take $1,393,000, and leave him $608,100. Courts hold that capital is entitled to a fair return. For two seasons the Soviet took the peasants' grain from them, and at the third season they refused to plant except for their own needs. Now, Russia is starving. Take away the incentive of a return and capital will not be risked in industrial enterprise. That is why new promotions are falling off so rapidly. Capital is industry's life blood, but the surtax is a halter around its neck to strangle it.---Barron's Weekly.

Winnipeg, a Power and Industrial Centre

A Manufacturing and Distributing City of International Importance—Great Falls Development Will Supply ample Facilities for Use of Country's Splendid Natural Resources

By A. W. McLIMONT.

You have asked me to let you know what I think the future possibilities of the Winnipeg district are and how they will be affected by the introduction of the new power from the Great Falls Plant of this company, which is now under construction on the Winnipeg River, and power from which is expected to be delivered in Winnipeg the latter part of next year.

While primarily a grain centre, Winnipeg is fast becoming a manufacturing and distributing centre of international importance. In the past ten years manufactured products in Winnipeg have increased 400 per cent, and as yet only the fringe of her manufacturing resources has been touched. There are numerous openings for new industries, and there is an abundance of raw material. The other essential to industrial development is Power, and this Nature has supplied in abundant quantities. In fact Winnipeg's power situation cannot be duplicated anywhere on the North American continent.

Mr. A. W. McLimont, Vice-president and Managing Director Winnipeg Electric Railway Co., Vice-president Manitoba Power Co.

The source of the power is the Winnipeg River, which drains 55,000 square miles of lake and forest, and which guarantees to Winnipeg and vicinity a superabundance ot cheap 24-hour continuous power which will be the greatest of all inducements for the location of industries. With the completion of our Great Falls development, there will be available 168,000 horse power, which will ensure the future industrial progress of Greater Winnipeg.

Western Canada produces immense quantities of grain, and to the present but little has gone through any process of manufacture in Winnipeg. Now that Winnipeg is assured of an adequate supply of cheap twenty-four hour power it is only reasonable to believe that instead of paying high export rates on raw material and import rates on the product, we must manufacture our natural products here in the West, and no place has facilities that can compare with those of Winnipeg.

To produce the great qualities of the products of the soil that Western Canada has produced in past years machinery for tilling the soil has been very necessary and to the present nearly all of this has been imported assembled and high prices have been the result owing to long haul and high freight rates. Winnipeg, within a few years, will be a manufacturing centre for agricultural implements of all kinds.

North and east of Winnipeg and quite close to the Great Falls development are vast mineral fields now in the infancy of their development. Within a very few years large blocks of power will be required in this area both for operating the mines and the smelting and refining of the ores.

The manufacture of electric steel in this vicinity has passed the experimental stage and comparatively large blocks of power are now being utilized for this purpose. Extension of this industry on a large scale is now under contemplation and will be put into effect as soon as cheap 24-hour power is available.

I could continue indefinitely discussing what I believe to be the great future of the Greater Winnipeg district, and how Winnipeg's prosperity will be stimulated when our plant is finished, but I believe it is only necessary for me to say that the experience of every community where large quantities of hydro-electric power have been introduced is that with electric power comes capital—with capital comes new industries—with new industries come more people, and with more people comes prosperity for everyone is the community.

A deputation, representing municipalities in the Niagara district, recently visited Ottawa and waited upon the Minister of Railways, requesting that the government make improvements to the Niagara, St. Catharines and Toronto Electric Railway. The deputation stated that the roadbed of this line was in pressing need of repairs and was holding up street improvements in many of the municipalities through which it passed.

Sign of Progessiveness

The advertising pages of this issue will well repay careful study. They contain the announcements of progressive manufacturers and dealers—men who are spending money to get your business. When you write them, mention the "Electrical News" as the source of your information. They will appreciate it.

The Power Resources of the Prairies

Water Power, Coal, Oil and Gas Combine to Provide a Vigorous, Aggressive People With Ample Means for Developing Their Tremendous Natural Resources.

By Water Powers Branch, Department of the Interior, Ottawa.

Pioneers in a new country are usually at first dependent on their own muscular efforts for the power necessary for their various labors; as settlement increases and wealth accumulates it becomes possible to employ machinery driven by steam or oil engines, small towns appear supported by and supplying the wants of the inhabitants of the surrounding territory. With the passage of time and the successful development of the country, pioneer towns become cities and new towns grow up, the inhabitants of which, conscious that the pioneer stage is past, demand and obtain for themselves the amenities of civilization in the form of public utilities—water supply, drainage, electric light and power and finally street railways. These public utilities need the support of both population and industry, and industry needs power, so that the development of a new country is closely linked with its power resources.

The Prairie Provinces provide examples of all stages of civilization ranging from pioneer in the north, to the most modern in the south, and the following brief discussion of the power situation shows both how well equipped the more densely populated sections are and how great are the power resources of the whole area for future requirements.

ALBERTA

The present thickly settled portion of the province is the south-east—this is almost entirely underlain by coal, has considerable natural gas resources now in use and good prospects of oil developments—the public utilities and manufacturing industries are largely operated by fuel and it appears must continue to be. In the north-west and north the large water-powers, the natural gas and oil fields, and vast bituminous sand deposits, will provide ample power for future development.

The province possesses available water power to the extent of 475,000 h.p. for maximum commercial development. The principal developments are those on the Bow river near Calgary with 32,380 h.p. installed but the majority of the water-power is considerably north of Edmonton and is not accessible to the, at present, most densely settled portions of the province.

Coal

Alberta is by far the greatest of all the provinces of Canada in coal resources, possessing as she does 88 per cent of all the coal in Canada and 1/16th of the coal resources of the world. As respects Canada the comparison may be shown thus in millions of tons:—

Alberta	1,182,572
British Columbia	83,828
Saskatchewan	65,943
Nova Scotia	10,715

The two classes of coal in Alberta are thus:—

Anthracite	1,183
Bituminous	217,593
Lignite	963,796
	1,182,572

Much of this "lignite" is of high grade, suitable for steam raising and domestic use. The anthracite is found at Bankhead and along the eastern slope of the Rocky Mountains and is also reported 200 miles northwest of Edmonton. The bituminous and lignite coals are distributed over the greater part of the province including the Peace River District.

In 1920 the output of coal in Alberta was the highest on record and constituted 41 per cent of the total Canadian output.

Oil

So far the recorded production has all been from the Turner Valley field 35 miles south of Calgary, this yielding a light oil as follows:—

	Bbls.	Value	Per Bbl.
1915	small		
1916	small		
1917	8,500	$63,302	$7.45
1918	13,040	100,004	7.70
1919	16,437	97,841	5.95
1920	11,718	75,295	6.42

Indications are, however, both numerous and promising over a wide area and active investigation is proceeding.

In the south the formations are similar to those of Montana where large producing wells have recently been located near the international boundary. Mr. Ommaney, Investigation Engineer, C.P.R., states that:—

"The oil in these two great producing Montana wells undoubtedly originated from the Devonian formations which extend throughout the whole of the vast Canadian territory to the north up to the newly proven field in the far northwest."

The latter refers to the oil strike by the Imperial Oil Co. at Fort Norman on the Mackenzie river, reported at 1,000 barrels per day. This however is far north on the Alberta boundary.

Along the Athabasca river, near Fort McMurray, 200 miles north of Edmonton, are vast deposits of bituminous sands, outcropping for some 175 miles, 150 to 225 feet thick and estimated to cover an area of 750 to 1,000 square miles with probable wide extensions under heavy cover. (Dr. S. C. Ells.) Some 72 samples have been analyzed by the Department of Mines. Seepage of gas, heavy oils and tar are found throughout this district and in addition to probable wells the bituminous sands themselves are the potential source by treatment of "an enormous source of crude oil, fuel oil and their derivable by-products." (G. G. Ommaney). Six companies are reported to be drilling in this field. The known deposits are estimated to hold some 30,000 million barrels of oil.

Near Peace River Landing oil has been found in two wells in apparently commercial quantities.

Oil Shale

Shale occurs at many points and the bituminous tar sands are largely overlaid by shale but no reports as to any extensive oil bearing shales appear to have been made.

Natural Gas

There are a number of large gas fields in active operation. The Medicine Hat field has 33 producing wells, the Bow Island field 21, the Viking field 9, and there are several other smaller fields. The total production has been:—

	M. Cu. Ft.	Value
1916	6,094,231	$1,113,296
1917	6,744,130	1,299,976
1918	6,318,389	1,358,638
1919	8,230,838	1,365,127
1920	5,633,442	1,181,345

Market for Power

The natural resources of the Province of Alberta are large and varied and the manufacturing industries show rapid growth as illustrated by the following Dominion Census extracts:—

	Invested Capital	Value of Product
1916	$42,239,693.	$30,592,833.
1919	66,673,667	94,855,759.
Increase	58 per cent	210 per cent

It may therefore be expected that there will be a rapidly growing demand for power.

SASKATCHEWAN

Saskatchewan possesses available water power to the extent of 513,000 h.p. at ordinary minimum flow and 1,088,000 h.p. for maximum commercial development, but none has yet been developed. That within the settled districts in the southern portion of the province is largely on wide rivers possessing little fall, so that a large demand for power must first exist to justify the cost of the necessary dams. In the northern half of the province there are fine water powers available for future needs and good lignite south of Churchill river.

Coal

The chief power resources for present needs is in the vast beds of lignite in the southern half of the province and it appears assured that the work of the Lignite Utilization Board of Canada will shortly: "result in the establishment of an industry of national importance" and that this fuel will be made available at favorable prices for all purposes. The process developed by the Board results in producing one ton of briquettes, equal in heating value to anthracite, from two tons of inferior fuel. In his evidence before the Special Committee of the House of Commons on the Future Fuel Supply of Canada last May the president of the Lignite Board said that the price of anthracite in Winnipeg was then $25. per ton and that: "It is difficult to think that we should rise above $12. (for briquettes), although I do not want to be quoted."

The deposits are estimated at 65,943 million tons. These occur mainly along the whole width of the extreme south and over a large area from the southwest border towards the neighborhood of Saskatoon, these areas being well served by railways; the chief production is in the Estevan district. Deposits are also reported at Lac La Ronge, south of Churchill River, and are said to be of better quality than that in the south. The quality generally is low but some of the seams being mined are from 8 to 15 feet thick.

The province is not yet a factor in the coal situation of Canada, the annual production being under 350,000 tons, but it appears that the work of the Lignite Board will soon cause it to become so.

Oil

While traces have been found they have not been in commercial quantities and the opinion seems to prevail that the geological structure does not warrant the expectation of this.

Market for Power

Saskatchewan is the leading grain producing province. The southern part is of the Plain Region, but the northern part is of the Laurentian plateau, underlain by rock and having some mineral possibilities. The manufacturing development has so far been comparatively small, but as the population is now over 760,000 it is likely to considerably increase. Many large milling plants exist and development may be expected in the manufacture of leather, woodproducts, bricks and pottery, flax, wool, etc. The forest resources are considerable and in addition to supplying local needs, quantities of sawn lumber are shipped out of the province.

MANITOBA

Manitoba possesses exceptionally large and well distributed water power resources. The available power at minimum flow is 3,270,000 h.p. and the maximum commercial development would be about 5,770,000 h.p., of which some 250,000 h.p. is now developed or under construction for the supply of Winnipeg and district.

Coal

In coal resources the province possesses about 176,000,000 tons of lignite at Turtle Mountain in the extreme south but this supply has not yet been appreciably developed and practically all coal is imported. It is probable that Manitoba will draw largely on the Saskatchewan supply when the briquetting industry is established (see remarks under "Saskatchewan") and later develop a similar industry of her own.

Of oil or gas in commercial quantities there appears little prospect as the geological formation is considered unfavorable.

Manitoba is therefore, particularly lacking in discovered fuel resources within her own borders but has such abundant and well distributed water power that future power requirements are well provided for.

Market for Power

The thickly settled portion of Manitoba is mainly within a very small portion of the province south of Lake Winnipeg. In population and value of manufactured products it ranks as the fourth province of the Dominion and the manufacturing progress of the principal cities is quite marked; Winnipeg now ranks (1919 Census of Industry) in all respects as the fourth manufacturing city in Canada.

This "prairie province", of which only 5% is prairie and 75% is covered by forest, produces in the north copper, gold, silver and other metals, gypsum clay, shale, limestone, timber, etc., extensive mining developments having taken place in the Le Pas and Rice Lake districts. Manitoba "must henceforth take an important place amongst the mineral producing areas in Canada, particularly in the output of copper and gold." (Commissioner of Northern Manitoba). The mineral production in 1920 was $3.900,000.

It will therefore be seen that the power demand is already large and that it is likely to increase rapidly over a wide area.

CENTRAL ELECTRIC STATIONS IN THE PRAIRIE PROVINCES

In considering the central electric station situation in the Prairie Provinces a survey of the topographical features of the country in their relation to the centres of population will show that at present it is only on the extreme easterly and westerly boundaries of our great central plains that any extensive hydro-electric developments may be looked for. Owing to the absence of rivers possessing any considerable fall along their courses the easterly portion of Alberta, the westerly portion of Manitoba and all of the well settled part of Saskatchewan are forced to depend for the primary power for generating electricity on the generous and widely distributed supplies of native fuel, wood, coal, gas, natural and artificial and the combustible oils.

For the purpose of this review central electric stations are divided into the two main classes of generating and non-generating stations. As indicated by the name, generating stations, are those which generate power for sale, while non-generating stations are those which purchase the power they distribute from organizations operating generating stations. In some cases generating stations also purchase power from other generating stations either to supplement their own supply or to provide for the requirements of heavy peak loads. These two main classes are further divided according to character of ownership into commercial or privately owned and municipal or publicly owned stations. The generating stations are still further classified according to the type of primary power used, into hydraulic and fuel power stations.

From the foregoing it follows that all central electric stations may be divided into the six fundamental classes of municipal hydraulic, commercial hydraulic, municipal fuel, commercial fuel, municipal non-generating and commercial non-generating. A comprehensive analysis of the central electric station industry in the Prairie Provinces along these general lines is given in the summary table. The data listed therein was collected in connection with the Census of Industry by the Dominion Bureau of Statistics in co-operation with the Dominion Water Power Branch, Department of Interior, and shows the status of the central electric station industry of the Prairie Provinces as at 1st January, 1920.

Alberta

Alberta with a population of 581,995 has 52 central stations representing a total investment of $13,276,980. and having a total installed capacity of 78,905 horse power. These 52 stations comprise 47 generating stations representing an investment of $13,242,067, and 5 non-generating stations with an investment of $34,913.

The generating stations include 3 commercial hydraulic, 23 municipal fuel and 21 commercial fuel stations. One of the hydraulic stations maintains a fuel station which is operated continuously in conjunction with the hydro station. It is noteworthy that while only 3 or 6.4% of the generating stations depend on water as a source of power they represent an investment of $5,335,651 or 40.3% of the total capital of the generating stations and have an installed

CENTRAL ELECTRIC STATIONS IN THE PRAIRIE PROVINCES - GENERAL SUMMARY

PROVINCES TYPES OF STATIONS	No of Stations	Total Capital Invested	Total Installed Capacity	Total Installed Primary Power: Hydraulic Turbines		Steam Engines		Steam Turbines		Gas & Oil Engines		Electric Generators: Total	Alt. Current		Dir. Current		Auxiliary Equipment: No of Stations with	Steam Engines, Steam Turbines, Gas & Oil Engines		Electric Generators		Personnel: No of Employees	Salaries and Wages
				No	Capacity	No	Capacity	No	Capacity	No	Capacity	Capacity	No	Capacity	No	Capacity		No	Capacity	No	Capacity		
		$	H.P.		H.P.		H.P.		H.P.		H.P.	K.V.A.		K.V.A.		K.W.			H.P.		K.V.A.		$
ALBERTA Population 581 995	52	13,276,980	78 905	13	32,380	50	3,498		31,700	3	1,327	61 842	69	58,976	14	2 866	1	3	2 250	3	1,850	399	496 639
GENERATING STATIONS																							
Commercial Hydraulic	3	5,335,651	32,380	13	32,380	—						22 250	9	22,250	—	—	1	3	2 250	3	1,850	52	66,081
Municipal Fuel	23	7,295,462	42 818	—	—	31	193	11	31,700	6	925	36,739	38	33,954	9	2,785	—	—	—	—	—	203	278,182
Commercial Fuel	21	610,954	3,707		—	19	3,305		—	7	402	2 853	22	2,772	5	81	—	—	—	—	—	137	150,422
Total	47	13,242,067	78 905	3	32 380	50	3,498	11	31,700	3	1 327	61 842	69	58,976	14	2 866	1	3	2 250	3	1,850	392	494 685
NON-GENERATING STATIONS																							
Municipal Non-Generating	3	14,413	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	1 684
Commercial Non-Generating	2	20,500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	5	34 913																				7	1 684
SASKATCHEWAN 761,390	61	6,758,769	42 806	—	—	18	6 407	1	31 067	62	5 332	37 746	69	36,501	24	1 245	—	—	—	—	—	370	468 718
GENERATING STATIONS																							
Municipal Fuel	38	6 453 214	41,599	—	—	15	6 007	1	31 067	39	4 525	36,853	60	36,013	5	840	—	—	—	—	—	343	444 168
Commercial Fuel	21	253,855	1,207	—	—	3	400		—	23	807	893	9	488	19	405	—	—	—	—	—	25	22 050
Total	59	6 707,069	42 806	—	—	18	6,407		31 067	62	5 332	37 746	69	36 501	24	1,245	—	—	—	—	—	348	466 218
NON-GENERATING STATIONS																							
Municipal Non-Generating	1	36 700	—	—	—		—	—	—			—		—	—	—	—	—		—	—	2	2 500
Commercial Non-Generating	1	15,000	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	—	—	—
Total	2	51,700	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	2 500
MANITOBA 613 008	29	16 914 922	75,892	6	72 655	15	2,490	—		3	747	50,817	31	50499	12	318	2	6	18 200	6	11,250	464	594,363
GENERATING STATIONS																							
Municipal Hydraulic	1	9,497,496	46,400	8	46 400	—	—	—	—		—	37 500	8	37,500	—	—	—	—		—		315	425 937
Commercial Hydraulic	3	6 440,933	26,255	8	26,255	—		—				11,063	8	11,063	—	—	2	6	18 200	6	11 250	76	96,335
Municipal Fuel	14	625427	2,914	—		12	2 230	—	—	9	684	2 083	14	1861	7	222	—	—	—	—		50	54 022
Commercial Fuel	6	53,538	323		—	3	260			4	63	171	1	75	5	96	—		—	—	—	7	1955
Total	24	16,617,394	75,892		72,655	15	2,490	—	—	3	747	50 817	31	50,499	12	318	2	6	8 200	6	11 250	448	578,249
NON-GENERATING STATIONS																							
Municipal Non-Generating	4	102,239		—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	10	7 987
Commercial Non-Generating	1	195,289		—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	—	6	8 127
Total	5	297,528		—	—	—	—	—	—			—	—	—	—	—	—	—	—	—	—	16	16 114
ALTA.-SASK.-MAN.	142	36,950,671	197 603	29	105,035	83	22,395	22	62 767	88	7 406	150 405	169	145.976	50	4.429	3	9	20,450	9	13 100	1233	1,559,450
GENERATING STATIONS																							
Municipal Hydraulic	1	9 497 496	46 400	8	46 400	—		—	—	—		37,500	8	37 500	—	—	—	—	—		—	315	425,937
Commercial Hydraulic	6	11 776 584	58 635	21	58.635	—	—	—	—	—		33 313	17	33 313	—	—	3	9	20 450	9	13 100	28	162 416
Municipal Fuel	75	14 374 103	87 331	—	—	58	18 430	22	62,767	54	6 134	75.675	112	71,828	21	3,847	—	—	—	—	—	596	776 372
Commercial Fuel	48	918,347	5,237	—	—	25	3,965	—	—	34	1,272	3.917	32	3.335	29	582	—	—	—	—	—	169	174 427
Total	130	36,566,530	197 603	29	105 035	83	22 395	22	62,767	88	7 406	150.405	169	145 976	50	4.429	3	9	20450	9	13 100	1208	1,539,152
NON-GENERATING STATIONS																							
Municipal Non-Generating	8	153,352	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19	12,171
Commercial Non-Generating	4	230 789	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	8.127
Total	12	384 141	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	20,298
MUNICIPAL STATIONS																							
Municipal Hydraulic	1	9,497,496	46,400	8	46,400		—		—	—	—	37 500	8	37,500	—	—	—	—	—	—	—	315	425 937
Municipal Fuel	75	14,374 103	87,331	—	—	58	18,430	22	62,767	54	6 134	75,675	112	71,828	21	3,847	—	—	—			596	776,372
Municipal Non-Generating	8	153 352	—	—	—	—	—	—	—	—	—			—	—	—	—	—	—	—	—	19	12,171
Total	84	24,024,951	133,731	8	46,400	58	18,430	22	62,767	54	6,134	113,175	120	109 328	21	3,847	—	—				930	1,214,480
COMMERCIAL STATIONS																							
Commercial Hydraulic	6	11,776,584	58,635	21	58,635	—		—	—		—	33 313	17	33.313	—	—	3	9	20450	9	13,100	128	162,416
Commercial Fuel	48	918,347	5,237	—		25	3,965	—	—	34	1,272	3.917	32	3.335	29	582		—	—	—	—	169	174427
Commercial Non-Generating	4	230,789	—	—		—	—		—							—	—	—	—	—	—	6	8 127
Total	58	12,925,720	63,872	21	58 635	25	3 965		—	34	1 272	37,230	49	36,648	29	582	3	9	20 450	9	13 100	303	344 970

capacity of 32,380 h.p. or 41% of the total primary power installation of the province.

The extent of the development of public ownership in the province is indicated by the fact that the investment and primary power installation in the 23 municipal fuel stations amounts to $7,295,462. and 42,818 h.p. respectively as compared with an investment and primary power installation of only $610,954 and 3,707 h.p. in the 21 commercial fuel stations.

There are three municipal non-generating stations with a total investment of $14,413. and two commercial non-generating stations with a capital of $20,500

Saskatchewan

Saskatchewan with a larger and more widely distributed population than either Alberta or Manitoba, possesses the greatest number of central stations, 61, but has the smallest investment, $6,758,769, and the smallest primary power installation, 42,806 h.p. As it is usually more advantageous to install small local fuel plants than to transmit electricity generated in fuel plants for any considerable distance this province has also the smallest number of non-generating stations, viz., 2.

Manitoba

There are 29 central electric stations in the province of Manitoba, 24 of which have generating machinery installed and generate part or all of the power they distribute, the remaining five purchasing all of the power they sell from other organizations.

The total investment amounts to $16,914,922. of which $16,617,394. or 98.2% represents the value of the 24 generating stations, and $297,528. or 1.8%, the value of the 5 non-generating stations.

The total primary power installation of the province amounts to 75,892 h.p. of which 72,655 h.p. or 95.8% of the whole is installed in the 4 stations depending on water as the source of their power, while the 20 fuel power stations have an installed capacity of only 3,237 h.p.

Summary

The three Prairie Provinces have a total of 142 central electric stations representing an investment of $36,950,671. and having a total primary power installation consisting of 29 hydraulic turbines totalling 105,035 h.p., 83 steam reciprocating engines totalling 22,395 h.p., 22 steam turbines totalling 62,767 h.p. and 88 gas or oil engines totalling 7,406 h.p.

The total capacity of the electric generators installed amounts to 150,405 kv.a. of which 169 alternating current generators account for 145,976 kv.a. and 50 direct current generators for 4,429 kw.

Three of the hydraulic stations maintain fuel power auxiliary equipment consisting of 9 prime power units totalling 20,450 h.p. and 9 electric generators aggregating 13,100 kv.a.

As the population of the southerly portions of these three provinces advances in numbers and prosperity it may be expected that there will be a corresponding increase in the number of fuel plants and a considerable extension in the transmission systems of the hydraulic power organizations. As the population spreads northerly water powers at present beyond the range of economic transmission of electrical energy will be developed to meet the needs of the advancing population.

Winnipeg Electric Railway Company's Uphill Fight

By our Winnipeg Correspondent

Public utility companies throughout Western Canada, as indeed throughout all other parts of the country, are still feeling the stresss of war-time operation and the aftermath of those unusual conditions. It is very encouraging to note, however, that many of these companies are making a good recovery and are in a stronger position today than they have been since 1914.

In this connection the record of the Winnipeg Electric Railway Company is worthy of particular mention. Harassed by jitney competition, by mounting costs of operation and withal a critical state of public opinion against it, the early part of 1917 found this company in a very perilous condition. Revenues of the company had dropped off during the previous three years at an alarming rate, and owing to the difficult conditions the company was forced to defer considerable maintenance.

In the fall of 1917 A. W. McLimont, one of the leading traction experts on the continent and a man of wide experience, particularly in the work of rehabilitating public utility properties, was appointed general manager of the company and almost from that point on the fortunes of the company took a decidedly improved turn. Within six months of taking charge of the property Mr. McLimont succeeded in effecting an agreement with the city council whereby jitneys were eliminated. A few months later the car fares were increased, giving the company more needed revenue to meet the higher operating costs, while an extensive programme of track and rolling stock rehabilitation was put into effect, with a resulting improved car service. Incidently Mr. McLimont installed the three wire system for the mitigation of electrolysis thus relieving a condition which had been a cause for controversy between the company and the city authorities for some time.

But perhaps the most remarkable reform accomplished under Mr. McLimont's comparatively short regime has been the change in public opinion towards the company. Everywhere in Winnipeg there is to be found the desire on the part of the public to co-operate with the street railway company and boost its service. Undoubtedly, this change can be traced in a great measure to the open policy which Mr. McLimont has adopted in his dealings with the civic authorities and the public. In the newspaper columns and through the medium of the company's bulletin distributed on the street cars, Mr. McLimont has consistently discussed the various problems concerning the utility, frankly telling the public of the difficulties in the way and pointing out how the removal of the difficulties would be in mutual interests. The public have responded in every instance and have undoubtedly appreciated the manner in which Mr. McLimont has made good his promises and kept faith with them.

Another factor, and not by any means the least important in the remarkably successful administration which has characterized this company during the past few years, has been the manner in which the company has made itself a part of the public life of the city, as represented in its employees taking an important and prominent part in all movements for the welfare of the community. It is the policy of the company, inaugurated by Mr. McLimont, to get behind all such movements and link up with every organization which aims to make for a bigger, better and brighter Winnipeg.

Down-stream side of Power House, Winnipeg Municipal Plant at Point du Bois

Winnipeg City's Hydro-electric System

Wonderful growth in last decade—Kilowatt hours generated in 1921 five times greater than in 1912—A detail summary of generating and distributing equipment and plant

By E. V. CATON, Chief Engineer

The power house of the Winnipeg Hydro-electric System is situaed at Point du Bois, on the banks of the Winnipeg River, 78 miles north-east of Winnipeg. Access to the site is obtained by 22 miles of standard gauge railway, owned and operated by the Department, connecting up with the Canadian Pacific Railway at Lac du Bonnet.

The Winnipeg River, with its tributary, the English River, has a drainage area of 52,000 sq. miles. The principal storage basins are the Lake of the Woods, 1500 sq. miles; Rainy Lake, 330 sq. miles; Lac Seul, 340 sq. miles. The total lake area in the watershed is 5,650 sq. miles.

Due to the nature of the country throughout the watershed the variations of flow, in the natural state, were comparatively low, minimum flow of 8,000 sec. feet, and maximum of 100,000 feet having been recorded. The annual variation is, however, much less than this and with the system of storage and control worked out by the "Water Power Branch" of the Dominion Government, a minimum flow of 20,000 sec. feet is assured.

At the power house site the river falls over a series of rapids which in their natural state gave a fall of 33 to 28 feet in a distance of approximately a quarter of a mile. By means of a dam across the head of these rapids a total head of 43 to 48 feet has been obtained and a pondage area of seven square miles. The dam across the head of the rapids consists of a rock fill dam extending 700 feet from the east bank, connecting up with a concrete spillway section 550 feet long; a second spillway 480 feet long spans a slight depression a short distance west of the main dam, while a third section 245 feet long and curving down stream forms part of the canal wall immediately above the intake. The forebay canal, on the west side of the river, extends 1200 feet down stream and conveys the water to the power house. A spillway, 225 feet, is placed in this wall below the intake, as shown. Across the south end of the canal and connected to the west shore by a wing wall is the power house.

The power house, a reinforced concrete structure 523 feet long, acts as a gravity dam at the end of the canal.

The water entering the power house, passes first through the trash racks and then through head gates into open wheel pits. The rack structure and head gate are covered in by a galvanized iron roof carried on steel trusses.

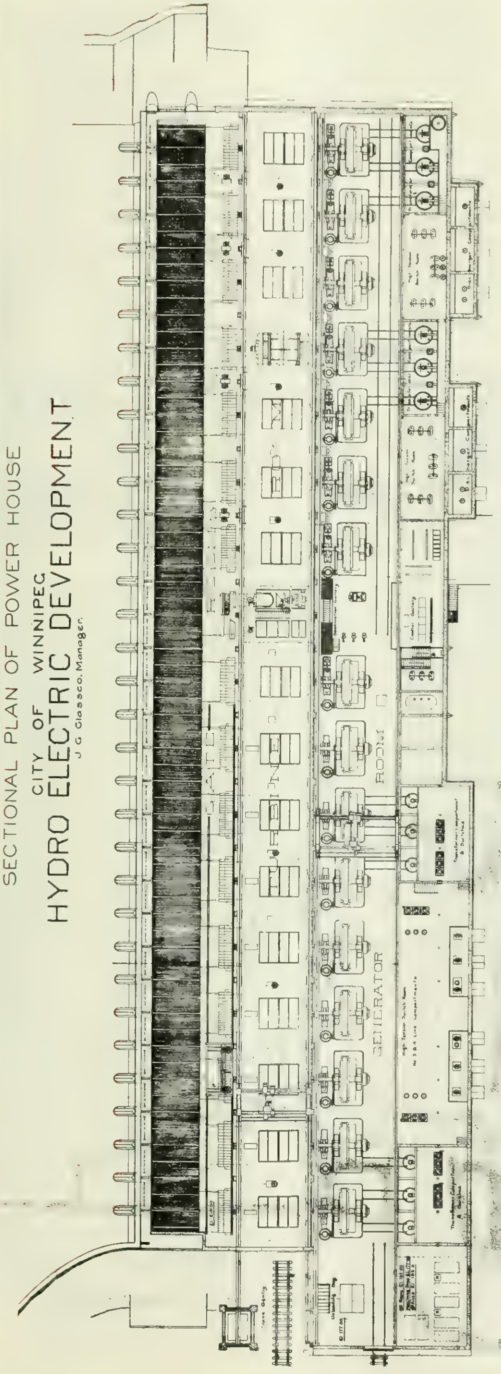
The power house is divided into three bays, viz: the wheel pits, generator room, switch and transformer rooms, the generator foundations being carried over the draught tubes. Sixteen wheel pits are provided and each pit will accommodate a 7,000 h.p. double runner horizontal water turbine. A 20 ton electrically operated crane runs the whole length of the turbine bay and extends outside the building on a gantry, below which is a spur line from the railroad which allows the loading and unloading of cars with a minimum of handling.

The eight original units were each provided with individual head gates operated off counter shafts by two 15 h.p. motors. The other units are operated with a travelling gate operating mechanism, which can place a gate into any required pit. This mechanism is driven by a 15 h.p. motor, mounted on the carriage. The original gates are timber sheathed on a steel structural frame and made in one piece, operated by screw hoists. The new gates are made in four parts, entirely of steel. In addition to the head gates, provision is made to install stop logs on the upstream side of all gates, if necessary.

The generator room is provided with a 40 ton electrically operated crane, running the length of the building. At the west end is an unloading bay and the standard gauge track runs from the outside into the bay a sufficient distance to allow of a car being placed entirely within the building. The basement is used for cable runs, pumps, etc.

The switch bay is laid out into a number of floors and compartments to accommodate the transformers, oil switches, bus bars, lightning arresters, control gallery and the necessary electrical apparatus. The west end, opposite the unloading bay, accommodates a fully equipped machine shop, offices, etc. The basement of this bay is used for storage rooms, etc., there being at the extreme west end a fireproof oil room having a capacity of 10,000 gallons of oil and a complete oil treating plant.

Between wheel pits 7 and 8 the generator room is set back to provide room for two water turbines in steel casings;



SECTIONAL PLAN OF POWER HOUSE
CITY OF WINNIPEG
HYDRO ELECTRIC DEVELOPMENT
J G Glassco, Manager.

each turbine drives a 310 kv.a., 3 phase, 60 cycle, 230 volt alternator for supplying the auxiliary light and power.

Water Turbines

There are at present installed eleven main units, consisting of:

Five—5,200 h.p., 164 r.p.m. Boving two runner horizontal type.

Three—6,800 h.p., 138½ r.p.m. Escher Wyss manufacture.

Three—7,000 h.p., 150 r.p.m. Boving manufacture

Two—400 h.p., 400 r.p.m. Boving manufacture, for the auxiliary service machines.

All machines are provided with oil operated servomotors and actuating governors, the three 7,000 h.p. units being provided with the Woodward actuator type governors.

Oil for the governing system is supplied under pressure by three rotary gear pumps, driven by 40 h.p. induction motors. The system is arranged on the open tank principle and each machine has its own storage tank.

Duplicate high pressure lines are run the whole length of the building and arrangements made to connect each machine with either line, the discharge being carried to sump tanks in the basement, from which the oil is drawn.

A small air compressor with storage tank allows the oil level in the individual storage tanks to be adjusted as required. The pressure is maintained constant by the automatic unloaders on the pumps. Oil strainers are provided in the suction of each pump and provision is made to allow of the oil being treated as required. This is arranged for by having two sump tanks and a connection for a De Laval centrifugal separator, so that by cutting out one tank its contents can be thoroughly treated.

Generators

The eleven main generators now installed consist of:

Five—3000 kv.a., 6600 volt, 3 phase, 60 cycle, 164 r.p.m., by Vickers, Limited.

Three—5000 kv.a., 6600 volt, 3 phase, 60 cycle, 138½ r.p.m., by Canadian Westinghouse Co., Ltd.

Three—6500 kv.a., 6600 volt, 3 phase, 60 cycle, 150 r.p.m. by Canadian General Electric Co., Ltd.

All generators are provided with their own direct connected exciters. The 5400 kv.a. machines are provided with temperature indicating coils, placed in the winding and connected to instruments on the control gallery. All bearings are self-lubricated but provision is made for water cooling, if necessary.

In addition to the above, two 310 kv.a., 230 volt, 3 phase, 60 cycle alternators, by the Swedish General Electric Company, are installed to supply power for local service in the building.

Transformers and Switches

There are at present installed four banks of transformers, and provision is made for an additional bank when required. At the present time the following transformers are installed:

Six—3,000 kv.a., single phase, oil insulated, water cooled, 6600/66000 volt.

Three—5,000 kv.a., do.

One—9000 kv.a., three phase, do.

All are manufactured by the Canadian Westinghouse Company.

In addition, two 300 kv.a., 3 phase, 6600/230/115 volt oil cooled transformers are installed for local service work, one of which is supplied by the Canadian General Electric Company and one by the Moloney Electric Company. All single phase transformers are connected in banks of three and in delta on both high and low tension windings.

Cooling water is taken from a pipe header, connected to all of the wheel pits, and the discharge is run directly into the tail race.

For treating the oil, both a blotting paper and centrifugal filter are provided.

The control board is located on a gallery, in the centre of the power house. The operating board is of the bench type, all instruments and relay board being vertical. All switches are electrically operated from a storage battery.

The 6600 volt switching is located all in one bay on the generator floor level. The switches being arranged in a series of bays, each bay containing the switches to control four machines and one bank. Duplicate switches and buses are provided throughout. All switches are installed in concrete compartments with fireproof doors.

The switches for the 6600 volt control are of the G.E. H-6 type and provided with the sub-compartment disconnecting switch on the machine side and wall mounting type on the bus side.

The high tension switches are installed on a mezzanine floor, each line and bank in its own compartment. High tension switches are provided on each bank and tie switches by means of which any bank or line can be interconnected through a transfer bus running the whole length of the power house.

Lightning arresters are installed on all lines, on two of the lines these are of the electrolytic type with the impulse gap, by the Canadian Westinghouse Company, and on the other two the oxide film type with sphere gaps, by the Canadian General Electric Company.

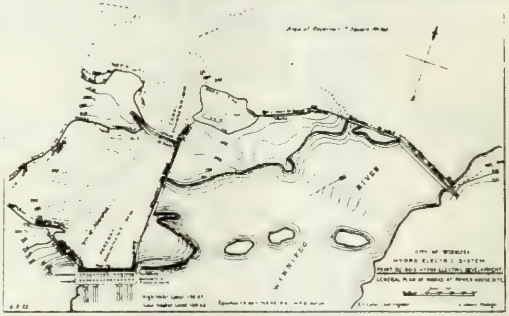
The control and instrument circuits are wired up with multi-conductor lead covered cables, carried on angle iron racks. All leads passing through a test board before being connected to the various meters, controllers, relays, etc. The individual conductors are wrapped with colored braid and a definite color scheme is maintained throughout the system.

All machine cables are cambric insulated, flame proof, braided cables, supported on a special structural steel and asbestos covered bracket.

The auxiliary apparatus in the power house includes a 150 kw. motor-generator set, an air compressor, storage battery, sump pump and other necessary equipment.

Transmission Line

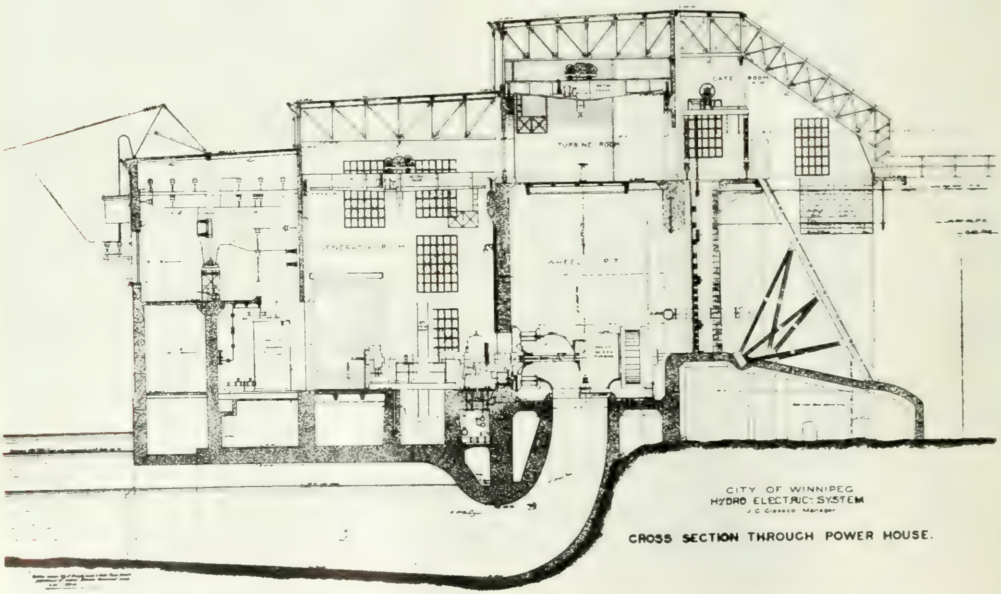
Four lines on two sets of steel towers and built along a private right-of-way owned by the Department, run between the power house and the city.


RIVER
WINNIPEG
CITY OF WINNIPEG
HYDRO ELECTRIC SYSTEM
POINT DU BOIS HYDRO ELECTRIC DEVELOPMENT
GENERAL PLAN OF WORKS AT POWER HOUSE SITE

Showing general plan of development

On one line the towers are spaced 600 feet and consist of alternate braced and flexible towers. The conductors are arranged on a six foot equilateral triangle, four conductors being on one plane and the other two conductors vertically above.

The other line of towers, which is spaced an average 400



CROSS SECTION THROUGH POWER HOUSE.

feet, has braced, flexible and lattice towers, depending upon the location. The wires are spaced vertically and a 3/8 steel ground wire is strung along the top.

Cables are 278,600 cm. plain aluminum; pin type insulators are used except on dead ends and angles, where suspension type insulators in strain position are used.

All footings are concrete and over large stretches are on piles.

At all angles, dead ends and special crossings, special heavy towers are used. The longest span on the line is 1,100 feet.

At each patrol station the lines are carried through disconnecting switches to allow of the lines being tested in sections if necessary. At Tyndall, 38 miles east of Winnipeg, a special switch tower has been erected, which, in addition to allowing the lines to be sectionalized, enables any one line to be connected to one of the others. It also serves as a tap off point for a small substation located there, which supplies current to the villages of Beausejour and Tyndall.

Communication between the city and the power house is provided by a telephone circuit, strung on separate poles erected along the right-of-way. This line is supported on 8,000 volt insulators and is connected every five miles to a telephone booth, provided with instrument and test switches. Drainage coils are connected at each end of the line and at the centre.

Cottages for patrol men are provided at four points along the line, adjacent to the sectionalizing switches.

Terminal Station

The terminal station in Winnipeg is a two storey and basement brick and structural steel building on the south bank of the Red River. The 66,000 volt power is stepped down to 12,000 volts and distributed underground to the four city sub-stations and overhead to Transcona and other adjoining municipalities.

On the top floor are placed all of the 66,000 volt switching, lightning arresters and high tension transfer bus. The general arrangement and connections of the switching are similar to that at the power house.

On the ground floor are placed the 12,000 volt switches and transformers. The switches are arranged in two rows, back to back, running the whole length of the building. On the south side are the transformer pockets and south of this is an unloading bay into which any transformer may be run and along which runs a 20 ton electrically operated crane. A spur line from the railroad runs the full length of this bay.

In the basement are located all of the 12,000 volt cables and the control cables; also pumps for the cooling water of the transformers, oil tanks and oil treating equipment.

At the present time the following transformers are installed:

Six—2700 kv.a., single phase, oil insulated, water cooled, 66,000/12,000 volt transformers, by the Canadian Westinghouse Company.

Three—2700 kv.a., do., by the Canadian General Electric Company.

Three—5000 kv.a., do., by the Canadian General Electric Company.

Connected in delta on both high and low tension sides.

There is also installed for the local service: One—500 kv.a., 12000/220 volt, three phase, oil insulated, self cooled, transformer, by the Packard Electric Co.

Cooling water taken from the city mains is circulated over a cooling tower of the natural draught type. All switches are of the electrically operated, remote controlled type, operated from a small storage battery.

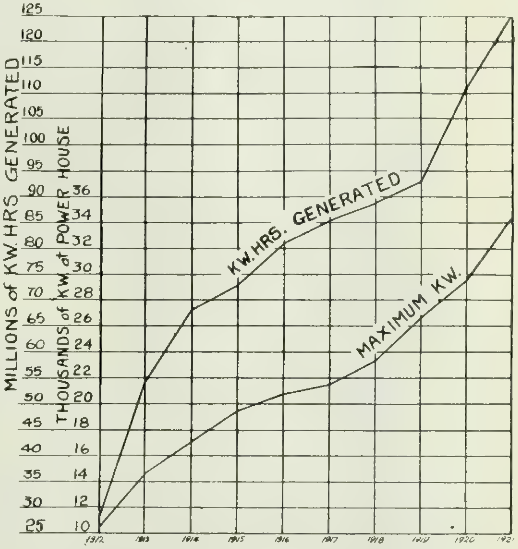
The control room is an extension bay at the centre of the north side of the building. On the top storey are located the control boards. All lines, banks and condensers are controlled from a bench board, the instrument and relay being on vertical panels built immediately in front of and plainly visible from any point of the control desk. Directly behind this board is placed the recording instrument board.

Across the room from the bench board is a vertical panel board controlling the 12,000 volt outgoing feeders and behind this another vertical board on which are mounted the feeder watt hour meters.

A two panel board having mounted on it two Westinghouse automatic regulators for the synchronous condensers is placed convenient to the main bench board.

A gallery leads off the control room into the high tension switch room and from it all parts of the high tension room are clearly visible.

On the floor below the control room are the cable rooms, to which all of the control and instrument leads are brought and from there distributed to the various panels.



Maximum load and annual output of City of Winnipeg Hydro-electric System Power House, Point du Bois, 1912-1921

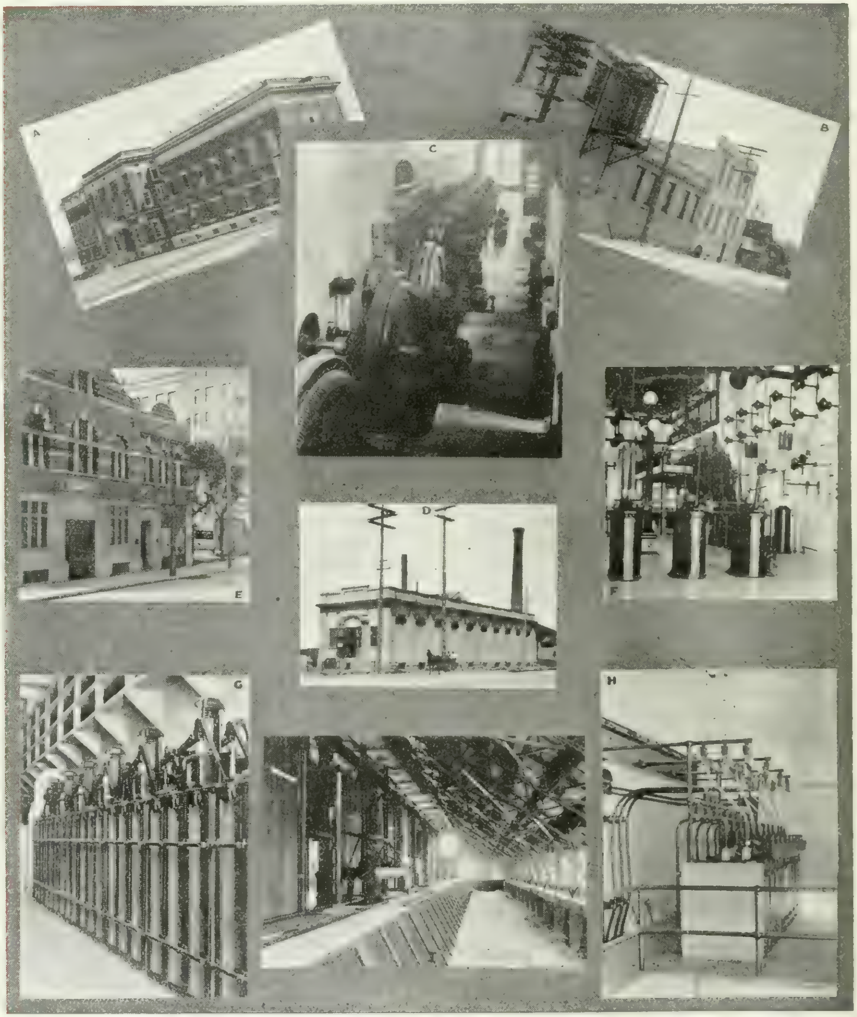
All instrument leads go direct to test links on the lower panel of the instrument and relay boards.

In these rooms are a series of panels, each panel corresponding to a panel in the control room. All control cables are brought to these panels and pass through fuses and then on up to the corresponding panel in the control room. By this means any faulty control lead can be easily and quickly located and trouble is limited to the one circuit.

As in the power house all control leads are multi-conductor, rubber insulated, lead covered cables, all conductors are distinctly marked in colors and a consistent color scheme is maintained throughout.

In the terminal station are installed two 6,000 kv.a. synchronous condensers, which are used to control the line voltage by varying the power-factor. These motors are wound for 6600 volts and are each supplied through a 6,300 kv.a., three phase, oil insulated, water cooled transformer,

Winnipeg Municipal Hydro-Electric System from Numerous and Different Angles



Various views of the Winnipeg Hydro-electric System's operations: A—City terminal station. B—May St. sub-station. C—Ten of eleven generators installed at Point du Bois. D—McPhillips St. sub station. E—King St. sub-station. F—Part of H.T. switching, terminal station. G—12,000 volt switching, terminal station. H—6600 volt starting switches for synchronous condensers. I—Trash racks and head gates, power house.

connected to the 12,000 volt main bus. The sets are self starting, the starting voltage being supplied by low voltage taps on the 6600 volt secondary. Electrically operated, interlocked switches are installed, which make the starting up practically foolproof. An oil pump is supplied to flush the bearing at starting. These sets are started up and controlled from the main control board, no other attention than a man to start up the oil pump and see that the oil rings are picking up being necessary.

Sub-stations

The 12,000 volt power is carried by lead covered, paper insulated cable, drawn in underground conduits to the various sub-stations. All cables are 250,000 cm., three core type, the number to each station depending upon the requirements.

King Street sub-station, situated in the centre of the business district, supplies the downtown and business areas. The 12,000 volt current is stepped down to 2400 volts and distributed partly underground and partly overhead. In addition to the a.c. supply a three wire d.c. supply at 250/500 volts is given for elevator and similar requirements.

The station equipment consists of nine 1,000 kw. single phase, oil insulated, 12000/2400 volt, self-cooled transformers, connected in banks of three and in delta on both high and low tension sides. Three 500 kw. synchronous motor-generator sets, each set consisting of a 2400 volt synchronous motor driving a 500/250 volt, 500 kw., d.c., three wire generator. All a.c. switching is of the electrically operated remote controlled type. A 500 kw., three-phase, 12,000/220 volt transformer supplies power for light and heat to the station and the main office and show room, located in the same building.

McPhillips Street sub-station is situated in the north-west end of the city, and supplies a mixed industrial and domestic load. The twelve thousand volts current is stepped down to 4,000 volts for distribution by six 500 kw. and three 1,000 kw., single phase, oil insulated, self cooled, 12,000/24,00 volt transformers, connected in banks of three; in delta on the high tension side and star on the low.

In addition to the above a bank of three 500 kw. transformers is connected delta-delta to supply 2,200 volt power to the city pumping station adjoining the sub-station. Both electrically operated and hand operated remote controlled switches are used. Single phase induction regulators, three per feeder, are connected in all outgoing feeders.

A large part of the street lighting system is supplied from this station by means of 7.5 amp. series regulators. There are also four 12,000 volt overhead feeders leaving this station, two of which go to Scotland Avenue sub-station, one to a large industrial load, and one to the village of Stony Mountain, twenty miles north.

Scotland Avenue sub-station, situated in the south-west end of the city, supplies almost entirely a domestic load. The twelve thousand volt power is stepped down to four thousand volts by six 500 kw. and three 1,000 kw. oil insulated, self-cooled, single phase, 12,000/2400 volt transformers, connected in delta on the high tension side and star on the low tension side.

All feeders are equipped with single phase induction regulators, three per feeder. All switching is electrically operated, remote controlled, the 4,000 volt feeder circuits being equipped with self-restoring relays.

From this station power is supplied to the Manitoba Power Commission. The 12,000 volt power is stepped up to 60,000 volts by three 1,000 kv.a. and three 500 kv.a., single phase, oil insulated, self cooled transformers, connected delta-delta. Power is conveyed on steel tower lines to Portage la Prairie and other points in the Province.

Several constant current transformers are installed in this station for street lighting purposes.

McFarlane Street sub-station is situated in an annex to the main terminal station and supplies a miscellaneous power and domestic load over the north and north-east end of the city. The 12,000 volt power is stepped down to 2,400 volts by six 1,500 kv.a., single phase, oil insulated, water-cooled transformers, connected in delta on high and low tension sides. All switching is of the electrically operated remote controlled type, the control board being placed on the main terminal station operating gallery. It is the intention to change this station over to 4,000 volts in the near future.

Mr. E. V. Caton

May Street sub-station is entirely given up to street lighting equipment. Power is taken at 2,400 volts and supplied to thirty-six 50-light mercury rectifier sets, 6.6 amp., which are used to light the main streets and down-town parts of the city.

Sub-stations are also located in the town of Transcona, supplying the town at 2,200 volts, and the Canadian National shops and elevator at 12,000 volts. Another sub-station is at Stony Mountain. At Birds' Hill an outdoor sub-station supplies the village and a large number of houses and golf clubs in the vicinity.

The curve showing the growth of the load on the system is of interest, as it will be seen that in spite of the war and business depression. the load is still increasing appreciably. The low cost of power and the vigorous publicity campaign put on by the Department has resulted in a large cooking load, over 5,000 electric ranges and 1,000 water heaters being connected to the system.

With its present plant the city has over 20,000 h.p. still available and at a small additional cost can supply an additional 30,000 h.p. in a very few months. Looking to the future, the rights to Slave Falls, a power site less than six miles below the city's present development, have been secured. From 60,000 to 70,000 h.p. can here be developed at a low cost and a preliminary survey is now being made.

The Quebec Gazette announces the incorporation of the Lake St. John Light & Power Company to generate and distribute electric energy for light, heat and power, within the counties of Lake St. John, Charlevoix, Saguenay and Chicoutimi, in the province of Quebec. The firm is capitalized at $250,000. Head office: Montreal.

The Winnipeg Electric Railway Co.

A Short Sketch of This Pioneer Industry Which Has Played Such an Important Part in the Development of the City and of the Province

By JOHN WHITSELL, Manager W. E. R. Co.

Undoubtedly one of the principal factors in the meteoric development of the city of Winnipeg has been the Winnipeg Electric Railway Company. The pioneer in supplying gas, electricity and transportation to the community, the company has progressed in advance even of the city. The history of the company can be briefly sketched. In the year 1881, A. W. Austin incorporated the Winnipeg Street Railway Company, and the first horse-drawn car was operated on Main Street on October 24th of the next year. The first electric street car to be run in the city was run from Main Street Bridge to River Park, in July, 1891. It was operated by Mr. Austin's company, which owned River Park. Work had been commenced on this line in 1890. Two years later the Winnipeg Electric Street Railway Company obtained its charter, and made an agreement with the city of Winnipeg.

The first work done by this latter company was the construction of a line on Main St. north of C.P.R. track to Selkirk Avenue to the Exhibition grounds, and that line was formally opened on September 5, 1892. In this same year, the company which operated the horse-car line, brought suit against the Winnipeg Electric and also the city of Winnipeg, claiming that it had exclusive rights, but the Privy Council finally decided the matter in March, 1894, holding that the horse car franchise was not an exclusive franchise.

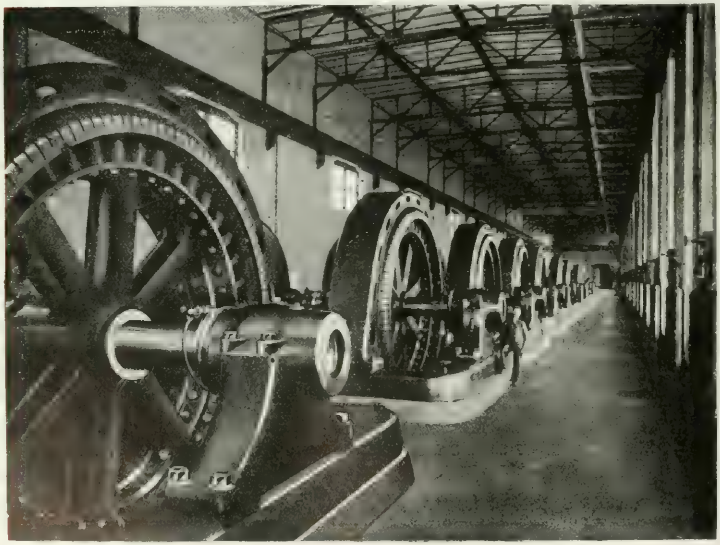
In the meantime, before the decision was handed down the electric company had built electric street car lines on Main Street, paralleling the horse car lines. These latter were in the centre of the street and the electric lines on either side. Thus is explained why the present car tracks on Main Street are so far apart. The attached cut shows four tracks on Main Street. It was taken from a photograph which was procured at the time that the quartette of tracks was a reality.

In 1894 both the systems were being operated; the horse cars and the electric cars were of course in active competition. A rate war was inevitable, and on February 4, 1894, the electric company were selling 50 tickets for a dollar and 12 for a quarter. After the Privy Council had given its decision, however, the Winnipeg Street Railway Company was bought out by the Winnipeg Electric Street Railway Company, and the horse cars ceased their operation.

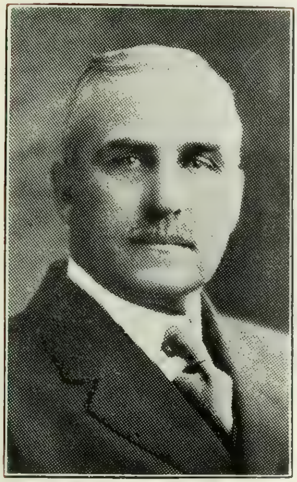
In those days Main Street and Portage Avenue were block paved. The street cars were about one-third the size of the present modern car. There were seven miles of street car tracks in the city and the population was 28,000. The number of employees on the company's payroll did not exceed 50; the annual operating costs of the company was under $50,000.00 and the invested capital $225,000.00. By the year 1900 the trackage had been increased to 16 miles on which were operated 36 single truck cars.

Period of Rapid Development

Then followed a period of rapid development both for



Winnipeg Electric Railway Co., Pinawa Channel. Interior generating Station

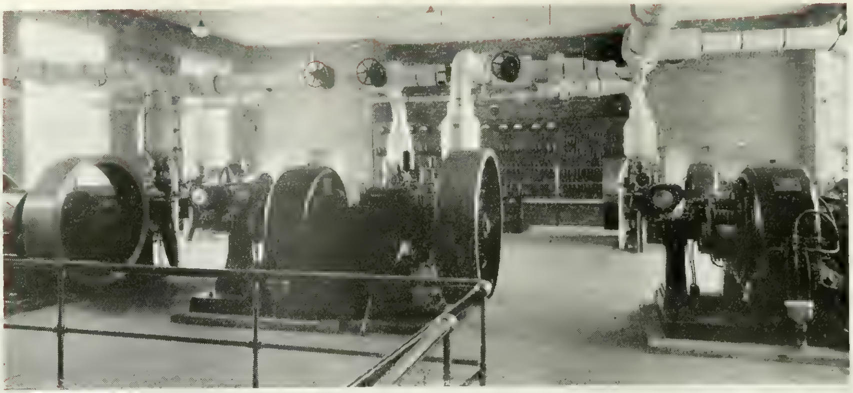


The Hydro-electric development of the W.E.R. Co. at Pinawa Channel on the Winnipeg river and, on the left, the company's manager, Mr. John Whitsell

the company and the city. Millions of dollars of new capital were put into the property until to-day the company's total investment exceeds twenty-five million dollars. From 7 miles of trackage in 1893 the company now has 112 miles of track within the city limits and 60 miles of track in the suburbs. Approximately 350 cars, of the most modern type of rolling stock are in service and the number of employees is close to 2,000.

With regard to the development of its electric utility, steam was the motive power which generated the electricity first used by the company to operate its street cars. From the small steam plant built on the banks of the Assiniboine River, the company has built and today owns and operates a large power station at Mill Street with a capacity of 12,000 h.p. and a number of sub-stations in various parts of the city. The capacity of the Mill Street plant was soon taxed to the utmost and with a rapidly increasing business the company realized that power generated from such a plant would be too costly a proposition, especially when within a few miles of the city, water power was running waste in almost unheard of quantities of horse power. As a result of investigation the company built its present large hydro-electric plant at Pinawa on the Winnipeg River, which was completed in 1906 and which has a capacity of 35,000 h.p. Although at the time that this was built, Winnipeg people wondered at the large development and speculated as to how it could possibly be absorbed, the demands on the company for power in the following ten years was so great as to necessitate securing further sites on the Winnipeg River, and in this connection it is interestting to note that the company's future supply is assured by the development of the Great Falls plant, now under construction by the Manitoba Power Company, Limited.

A relic of the days when Winnipeg had two Tramway Systems



Engine Room, Provincial Power House, Regina

New Power House for Gov't. of Saskatchewan

A new power house has just been built by the Government of the Province of Saskatchewan to supply power, light and heat to the Legislative Assembly and to the other Government buildings, located nearby. It was designed by the Provincial Architect, M. W. Sharon, who can be complimented on erecting a power house harmonizing with the beautiful building adjacent to it.

The whole of the electrical work was done by the Sun Electrical Company, Ltd., of Regina, under the direction of its engineer, Garnett E. Perry. Four 250 h.p. Goldie & McCulloch boilers, which are situated in the east end of the building, supply steam for operating the six horizontal, single cylinder, 125 I.H.P. Leonard & Sons engines; direct connected to 75 kw., 250/125 volt, compound wound, 3-wire, d.c. generators, running at a speed of 277 r.p.m., conveniently arranged in two rows of three, in the well ventilated and illuminated engine room.

The huge, unsightly stack of the original power house has been replaced by two large induced draft fans, operated by 15 h.p. Westinghouse variable speed motors, which preserves the outward beauty of the building lines and retains efficiency.

Being a low voltage 3-wire d.c. plant, with six generating units, the control board is necessarily massive and expensive. It was designed and manufactured by the Canadian General Electric Company, at their Peterborough plant. The board is made up of nine two-piece panels of 2¼ inch black marine finished slate, ninety inches high.

The generator control panels (six in all), 36 inches wide, mounting: two 400 amp. ammeters and shunts; one field rheostat; one 4-point voltmeter receptacle; two 400 amp. D.P.S.T. knife switches; one 200 amp. S.P.S.T. knife switch; two recording watthour meters, and two D.P. 2-coil, 400 amp. circuit breakers.

The four poles of these breakers are tied together electrically, so that if one side should go out the other would immediately follow, otherwise the balancing compensator would be endangered. These breakers are equipped with no-voltage, overload and reverse current relays, the tripping coils being placed only in the main poles. The circuit breakers are placed in the lines beyond the series fields.

There are three feeder panels—two for lighting and one for power—24 inches wide, on which are mounted the knife switches, controlling the various feeders. All the fuses, for feeder switches, are mounted 18 inches in the rear of the main board, on separate panels.

The two voltmeters (one connected to the bus-bars and the other to 4-point receptacles to assist in equalizing the incoming machines) are mounted on brackets over the top of the centre panel.

While the front of this control board is very imposing, the manufacturers are to be commended on the ingenious manner in which their engineers planned the mounting and connecting of the bus-bars to the various pieces of apparatus and switches, mounted on the panels, which completes in a very workmanlike and substantial manner the fine finish of the main board.

In order to handle the load in the Assembly buildings, a great number of heavy lead covered, paper insulated, cables were necessary, and, owing to the distance of transmission being great (over 1200 ft.) it was found advisable by the engineer, Mr. S. S. Kennedy, of Winnipeg, who planned the electrical installation for the Government, to dispense with conduit and adopt 3/8 inch steel channels, mounted on angle iron supports, on the wall of the tunnel; also, all cables from generators to the switchboard were handled in a similar manner, making it very convenient at all times to replace a defective cable without disturbing others.

This electrical contract, amounting to $50,000. was taken by the Sun Electrical Company, Ltd., of Regina, who were at the same time handling the large electrical installation in the new Mental Hospital at Weyburn, Sask. This company deserves much credit for the very successful manner in which it has done its work. Its success as a construction company is directly due to the very capable manner in which the business of the company is handled by J. R. Young, managing director; to its construction engineer, Garnett E. Perry, and to its staff, whose efficiency can be seen by the quality of the work exhibited in this and other jobs of a similar nature undertaken by the company.

Showing General Scheme of Manitoba Power Company's Development

The Next Big Western Power Scheme

Manitoba Power Company Actively Developing Great Falls, Winnipeg River—Contracts Let for Two Complete 28,000 H. P. Units—Complete Capital Cost Will be less than $80 per H.P.

Active construction work is now under way on the Great Falls Development on the Winnipeg River by Manitoba Power Company Limited, after considerable preliminary study and investigation. Work is going forward rapidly and excellent camp quarters for the large force of men necessary for the work have been constructed, comprising up-to-date mess-halls and kitchens, bunkhouses and hospital, together with administration buildings and offices. A complete construction plant has been erected, including rock crushing plant, mixing plant, concrete chuting equipment, storehouses, machine, blacksmiths' and carpenters shops and a complete yard and track layout for the handling of the large quantities of materials involved in the work.

A standard gauge railway, 13½ miles in length, has been constructed, connecting the Canadian Pacific Railway tracks at Lac du Bonnet with the power site at Great Falls. This railway is now being extended a distance of three miles, from the power site to White Mud Falls, lower down the river. The road is well ballasted, is laid with 60 lb. steel and compares favorably with other branch line roads in this section of the country.

Over 1200 lineal feet of cofferdam, varying in depth from ten to thirty-five feet have been constructed, and in order to expedite the work a temporary boiler plant was installed and the power house site, enclosed by the cofferdam, was unwatered by steam pumps. Steam drills were also put in service for rock excavation.

A 60,000 volt double circuit transmission line, eighteen miles in length, supported on steel towers forty-five feet high, has now been constructed from a point on the Pinawa-Winnipeg line of the Winnipeg Electric Railway Company to the power site, and connection has been made to the City of Winnipeg Hydro-electric System's line for power supply during construction. This line will ultimately form one link of the permanent transmission system, connecting the new development with the existing water power plant on the Pinawa Channel, and with the sub-stations in the City of Winnipeg. Electric power was made available over this line early in February, and all the construction plant is now being operated electrically. A temporary transformer house has been constructed at Great Falls, which contains one bank of 600 kw. transformers and one bank of 1,500 kw. These latter transformers, while they are now being used for construction purposes, are primarily designed for station service use in the power house. Power is being distributed at 2200 volts and a double circuit wood pole line has been run from this transformer house to White Mud Falls, where a sub-station containing about 700 h.p. in 2200 volt motors operating compressors, derricks, etc. has been installed. With electrical operation at Great Falls, the work of rock excavation has been greatly facilitated, and to date approximately 30,000 cubic yards of solid rock have been excavated for the power house draft tubes and tail race. This constitutes about one-half of the total excavation required.

General Layout

The power house proper is located at Island No. 2, where the dam to be constructed will hold the head waters above the power house at Elevation 808, thus forming a pond or peak load reservoir of approximately 2,000 acres in extent, providing a deep, wide and extensive body of water reaching upstream a distance of five miles and flooding out the existing rapids, thus obviating the trouble so often experienced in these northern latitudes from frazil ice, which forms in swift, turbulent water.

The dam at Island No. 2 will raise the present water level forty-six feet, and investigation has disclosed the reach of the river below the power house to be from thirty to ninety feet in depth, this level being maintained by a rock reef across the river at White Mud Falls. By excavating a channel 200 ft. wide, 20 ft. deep and about 1800 feet in length through this reef, the entire reach of the river between White Mud Falls and the power site will be lowered ten feet or more, thus making a total operating head of fifty-six feet, for which head the turbines are designed. The rock excavated from this channel will be hauled by railway to the power site and used in the construction of the rock-fill dam across the East Channel, and will also supply crushed stone for the concrete.

At the site selected for this development the river is divided into two channels by an island, upon which the central section of the dam is located. It is possible, therefore, to close the West Channel by cofferdam, as has been done, passing all of the water through the East Channel. The gates and wheel pit openings in the power house in the West Channel, which will be completed first, can then be used to pass the discharge of the river while construction is under way in the East Channel.

The Dam

As shown on Fig. 1 the dam, from the west shore to the power house, will be of the usual solid concrete non-overflow type, approximately 750 feet in length with a maximum depth of seventy feet. From the end of this dam to the island the power house bulkhead constitutes the dam. A curtain wall along the upstream face of the intake walls of the power house, extending six feet below the forebay level, will prevent ice and other foreign matter from entering the wheel pits. Adjoining the easterly end of the power house a wing wall, one hundred feet in length, will extend up the river parallel to the current. In this section a skimming weir for discharging ice and other floating materials will be included.

The first 260 feet of dam on the island will be similar in design to the non-overflow dam referred to above. The next 400 feet will be of the overflow or free spillway type, with crest at elevation 808 and with provision for flash boards to raise the head water. Four steel sluice gates, 50 ft. wide and 30 ft. deep, will be located on the crest of the island. These sluice gates are designed to pass the full flow of the river under maximum flood discharge conditions. The section of the dam between these sluices and the easterly end of the island will be 200 ft. in length and of non-overflow section, similar in design to the west wing wall.

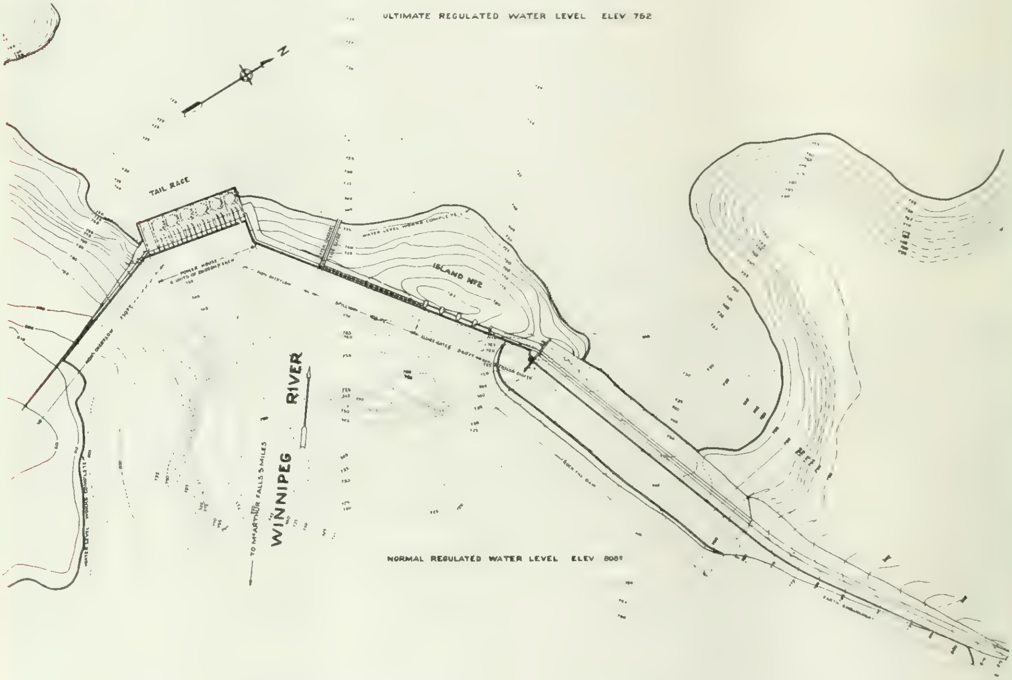
The dam across the East Channel will be of rock-fill section, 1000 feet long, and with a maximum height of seventy feet and crown ten feet wide. The slope of the rock will be one to one. The upstream face of this dam will be faced with graded material consisting of broken rock, crushed stone, gravel and clay. The clay blanket will be built to a slope of 2½ to 1 and will be ten feet wide at the crown, and to prevent sliding a rock toe-fill will be placed at the lower edge of the fill.

The section on the east bank, 1100 feet in length, will be an earth embankment, with twenty foot crown, built to a slope of 1½ to 1 on the downstream side and 2½ to 1 on the upstream side, and will contain a concrete cut-off core wall.

The Power House

The power house will be 110 ft. wide, 380 ft. long and have a maximum height of 145 feet. The foundations will be of reinforced concrete and will carry a structural steel superstructure with brick curtain walls provided with steel sash. The roof will be of gypsum block tile covered with standard tar and gravel roofing.

The power house proper will contain six vertical turbo-generators with the usual intake racks, stop-logs, head-gates, etc. At the entrance to the scroll case for each unit, three pairs of steel head gates will be provided. Gate openings will be sufficient to pass the flow required for each turbine at a velocity of approximately 4.5 feet per second. Stop-logs will also be provided to facilitate inspection and


ULTIMATE REGULATED WATER LEVEL ELEV 762
N
TAIL RACE
POWER HOUSE
6 UNITS OF 28000HP EACH
NON OVERFLOW
WATER LEVEL WORKS COMPLETE
ISLAND No2
SPILLWAY
SLUICE GATES
WINNIPEG RIVER
TO McARTHUR FALLS 5 MILES
NORMAL REGULATED WATER LEVEL ELEV 808'

General Layout of Dam and Power House, Manitoba Power Co.

maintenance of the gates. The screens, consisting of heavy steel bars, six inches apart and supported on a steel framework attached to the sub-structure, will be provided for preventing debris from entering the wheels.

Fig. 2 shows a cross-section of the power house, from which the relative arrangement of the main equipment can be noted. The switchboard and control room will be located on a gallery at the westerly end of the power house, beneath which will be located the governor and oil pumps, air compressors, water pumps and other auxiliary equipment.

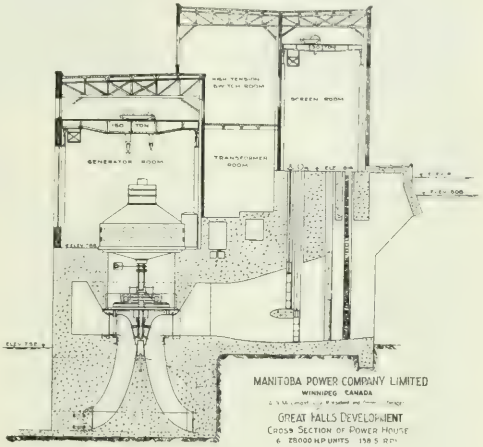
Initial Development

The initial installation is to include a power house building complete to accomodate three units, with screens, stop-logs, gates, operating mechanism, cranes, machine shop, heating and other necessary equipment for the successful operation of the plant. The substructure of the balance of the power house for the accommodation of the remaining three units will be completed only to such a point as is necessary in order that future extension can be made without unwatering expense.

The electrical installation includes two generators, the third to be installed in the space prepared when required, two banks of transformers and switching equipment for delivering the power to the outgoing lines. The dams and other permanent works will be constructed for the complete installation. The hydraulic installation includes the necessary turbines, governors, etc. for two units.

Hydraulic Equipment

Turbines:—The turbines will be of the single runner, vertical shaft, diagonal or propeller type, and will develop 28,000 h.p. when operating under ahead of fifty-six feet and running at a speed of 138.5 r.p.m. Under these conditions the guaranteed efficiency is eighty-seven per cent. The run-away speed of these turbines when operating under full gate opening and under an effective head of fifty-six feet will be about 315 r.p.m. The full weight of the revolving part of the turbine, including hydraulic thrust, but not including the generator field is about 600,000 lbs. The shipping weight of each turbine with its accessories is 725,000 lbs. The water enters the turbine through concrete scroll cases and will be guided into the movable guide vanes by individual stay vanes, imbedded in the concrete at their upper and lower ends. The stay vanes will be provided with foundation bolts and adjusting screws at the upper end for adjusting the cast iron pit liners before pouring the concrete. The runner will have six blades, cast separately, and securely bolted to the runner hub. The operating gear for the guide vanes will be of the "off-set" type, which differs from the usual construction in that the guide vane levers are offset from the radial position, and as the vanes close the levers turn in a direction still further away from the radial position, resulting in a toggle action. This action greatly improves the speed regulation of the unit, due to the fact that at large gate openings the movement of the guide vanes is greatest and the amount of this movement decreases as the vane closes. Furthermore, as the guide vanes close the torque increases, reaching a maximum value in the closed position where the hydraulic load is also a maximum. The links connecting the guide vane levers with the operating ring are of the double-shearing type.



Cross Section through Generator

Governors:—The governors will be of the double floating level type, with relay belt drive from the main shaft. They

Construction Views of Manitoba Power Company's Development are provided with hand control mechanism and the usual accumulator tanks, interconnecting piping, tachometer, etc., and electric motor for remote control. The governor will adjust the gates without "hunting" when the speed varies one-half to one per cent from normal, and they will be so adjusted as to open or close the turbine gates in not more than three seconds time. With full load change the time of gate movement is three seconds, and the percentage speed change, load off to zero is twenty-five per cent and load on from zero is thirty-two per cent.

Draft Tubes:—The draft tubes will be formed in the concrete and will be of the "Centercone" spreading type. The centercone will extend upward to an elevation just below the runner and the upper end of this cone will be provided with a cast iron cap which will extend through the lower end of the runner cap, forming a suitable pedestal for supporting the rotating element of the turbine when the thrust bearing is dismantled. Another advantage of carrying the centercone up to the runner discharge is that it avoids all flow close to the axis, where the tendency to form vortices is greatest.

Electrical Equipment

Generators:—The generators will be of 21,000 kw. capacity, of the vertical type, running at 138.5 r.p.m. This rating is based on full load temperature rise of 60 deg. C. by thermometer, or 70 deg. C. by thermo-couple, with surrounding air at 25 deg. C. The machines will have a guaranteed efficiency of 97.1 per cent and reactance of 25 per cent. The weight of the machine is 480,000 lbs. with flywheel effect of 10,000,000 WR^2.

These machines will generate three phase, sixty cycle, alternating current at 11,000 volts, and will be provided with 150 kw. direct connected exciters.

Thrust Bearings:—The entire revolving element of the unit will be supported by a Kingsbury thrust bearing mounted on top of the generator stator. This bearing has an approximate capacity of 950,000 lbs. at a speed of 138.5 r.p.m. and is provided with water cooling coils and the usual valves, thermometers and indicating devices which are customarily furnished with these bearings.

Transformers:—The transformers will be 7,000 kv.a. each, single phase, water cooled, 11,000/60,000 volts, with taps in the high tension winding to give 10,000 volts reduced capacity in the low tension windings. The guaranteed full load efficiency is 98.9 per cent, regulation at full load power factor 1.5 per cent and impedance approximately 9 per cent. The temperature rise at full load until constant is 55 deg. C.

The insulation test, high voltage to low voltage windings and core is 121,000 volts and from low tension windings to core 25,000 volts. The voltage across full winding is twice the normal.

Each transformer requires approximately 1,020 gallons of oil, weighing 8,800 lbs.; the weight of the transformer, less oil, being 25,000 lbs. The height from the leads is 172 ins. and from the cover 130 ins.; floor space covered being 93 ins. by 55 ins.

Switching Equipment:—Each generator will be connected directly to the low tension side of its transformer bank, without any intermediary oil circuit breakers or bus bars, which virtually makes each generator and its transformer bank one unit. The 11,000 volt cables from the generators to the transformers are carried in fibre conduits.

The high tension oil circuit breakers connecting the transformers to the high tension bus bars and line are of standard G.A.3 type, 73,000 volts, with interrupting capacity of 3600 amps., and each switch is provided with automatic overload trip.

General

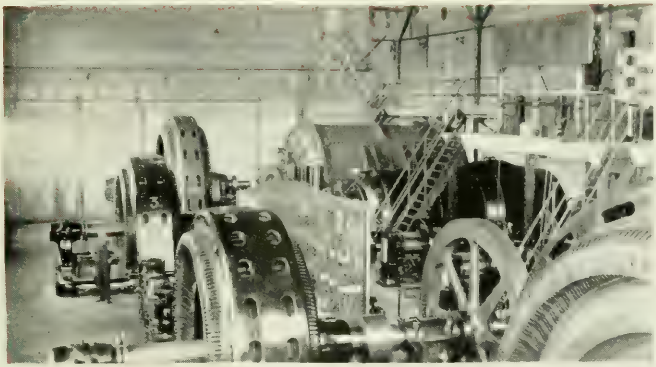
The design of the plant is modern in every respect and in physical dimensions and quantity of water used the turbines are the largest for which contracts have ever been placed. The type of unit finally adopted is that recommended by a Water Wheel Committee consisting of five prominent hydro-electric engineers and the design of turbines was submitted by one of the largest Canadian turbine manufacturers, who has done very creditable work in developing a machine of such high speed and power output, resulting in a machinery cost of less than $14.00 per h.p. including turbines, generators, exciters, thrust bearings, transformers and switches. The capital cost for the initial installation, including all permanent works for the complete development is less than $80.00 per h.p. and the cost for the complete plant will be less than $60.00 per h.p. which is undoubtedly the lowest unit cost per horsepower yet recorded on this continent for a plant of this magnitude.

The plan of development is in accordance with the general scheme of the Water Power Branch of the Dominion Government, and forms the principal link in a chain of potential developments extending from Lake of the Woods to Hudson's Bay, aggregating several million horsepower.

The contractors for this work are Fraser-Brace Limited, who have successfully completed other large construction jobs of a similar nature, including the large dam for the International Nickel Company at Turbine, Ont., the La Loutre storage dam for the Quebec Government, the paper mill, dam and power house for Price Bros. at Chicoutimi, Que., and the Cedars Rapids Manufacturing and Power Company's development on the St. Lawrence River. In the execution of the above works the contractors have gathered together a very efficient organization which has been transferred to Great Falls, together with their complete construction plant, thus ensuring the successful construction of the Great Falls development.

Mr. F. H. Martin

Sir Augustus Nanton is president of the Manitoba Power Company Limited and Mr. A. W. McLimont is vice-president and general manager, under whose direction all of the work is being carried on by a loyal and efficient engineering and construction force. Mr. Julian C. Smith is supervising engineer. Messrs. L. J. Hirt, R. S. Lea and C. O. Lenz are consulting engineers and Mr. F. H. Martin is chief engineer and designer.



Power House No 1 Calgary Power Company

Mr. F. J. Robertson

Water Power in the Calgary District

Two Developments by Calgary Power Company—Regulation a Big Problem—Supply to City of Calgary and Private Industries

The hydro-electric system of the Calgary Power Company, Limited, has been in continuous operation since the year 1911. The two plants are situated in the foothills of the Rockies some fifty miles west of the City of Calgary. No. 2 plant, Kananaskis Falls, is at the junction of the Bow and Kananaskis rivers, while No. 1 plant, Horseshoe Falls, is two miles down stream.

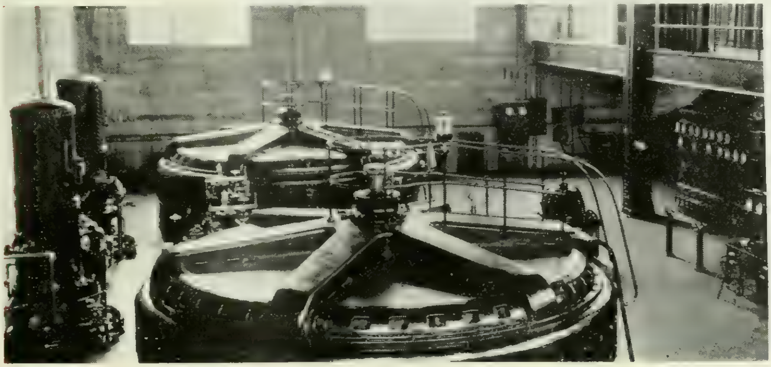
The Horseshoe Falls plant was completed in 1911 and the following year work was commenced on Kananaskis Falls plant, the completion of which gave a total installed capacity of 31,000 H.P.

The dam at No. 1 plant is of solid concrete and is provided with inspection tunnel. Flood water is handled by means of Stoney type sluice gates, operated under oil pressure; by four stop log openings and 140 feet of free spillway. The flood water equipment has been called upon to discharge 24,715 c.f.s., this somewhat abnormal flow occurring in the spring of 1916. It has been clearly shown that during flood periods the principal source of trouble to be anticipated is not so much the great and rapid increase in the quantity of water to be handled as the vast amount of drift wood which accompanies it. Entire fir trees, measuring in some cases up to fifty feet in length, which have been uprooted and brought down with the flood, require to be disposed of before any serious jam has been allowed to form.

No. 1 Power House

The equipment at No. 1 power house consists of two 6,000 h.p. Wellman Seaver Morgan turbines, coupled to two 4,000 kv.a., 12,000 volt, 3-phase generators; two 3,750 h.p. Boving turbines, coupled to two 2,500 kv.a., 12,000 volt 3-phase generators, and two water-driven and one motor-generator exciter, any of these exciters being capable of supplying all four generators. The operating head of the turbines is 70 feet.

The transformers consist of four 3,000 kv.a., 12,000 to 55,000 volt, O.I.W.C. transformers, the transmitting voltage to the company's terminal station in Calgary being 55,000. All the switching equipment at No. 1 plant, including the



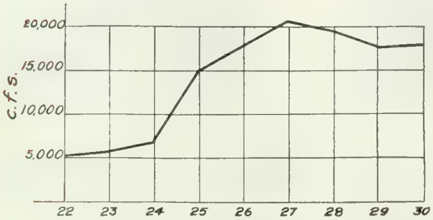
Power House No 2. Calgary Power Company

remote control desk, is of Canadian Westinghouse Company manufacture.

No. 2 Power House

The dam at No. 2 plant is of solid concrete, and is provided with inspection tunnels, but it differs from No. 1 dam in that flood water is controlled wholly by means of stop logs, which are handled by an electrically driven winch. The discharge capacity with all stop logs removed, and water at normal operating level, is computed at 46,100 c.f.s.

The water is led to the gate house by means of a canal, excavated from solid rock, while the control to the turbines is through Tainter type gates.



Bow River at Horse Shoe Falls, June 1915

The power house equipment consists of two vertical units of 5,800 h.p. each, manufactured by the Canadian Allis-Chalmers Company; two 12,000 volt generators of Swedish General Electric Company make, and one motor-driven and one water-driven exciter. The switchboard and switches are of Canadian Westinghouse Company manufacture.

Transmission

Duplicate transmission lines of No. 0 stranded aluminum connect the two generating stations, similar lines feeding the large plant of the Canada Cement Company at Exshaw, and also connecting the company's terminal station at Calgary. The equipment at this point consists of step-down transformers to 12,000, 2,400 and 600 volts, the city of Calgary taking part of their requirements at 12,000 volts and distributing from the company's station at 2,400 volts for local requirements.

All transmission lines are fully protected by means of electrolytic lightning arresters, which are placed in both power houses, at the Calgary terminal station and at the Exshaw cement mill sub-station.

Regulation

In addition to constructing the above hydro-electric plants to meet the requirements of the district, the Calgary Power Company has in operation a dam at Lake Minnewanka, 30 miles distant, the immediate object being to raise the elevation of this lake twelve feet, thereby impounding 44,000 acre feet of storage water, which is drawn upon during the low water period.

When the dam was constructed it was realized by the company that it would ultimately be necessary to build a power plant at this site, and the dam was therefore designed with this end in view.

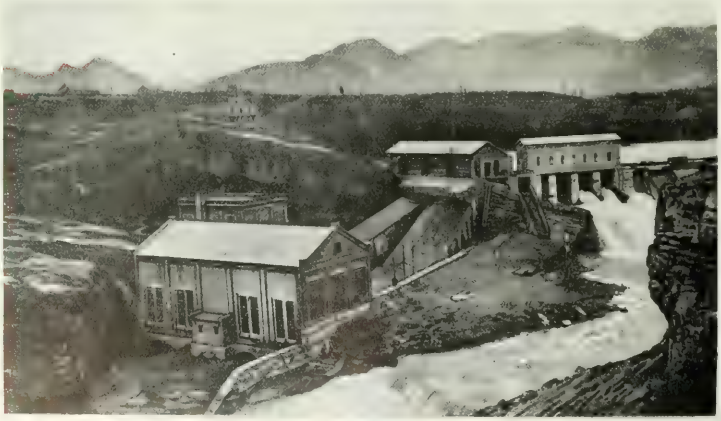
A Heavy Investment

The company's total plant investment is in the region of $5,000,000 and there can be no doubt that the completion of the plants described has contributed in a great measure to the rapid development of industrial activities in the Province of Alberta.

The company's engineers have been steadily engaged during the last few years in collecting all data in connection with future power projects, and in this connection, invaluable aid has been rendered by the Dominion Water Power Branch. It is fully recognized that the time is not far distant when the present system will require to be extended to meet the rapidly growing demand for power in Alberta. All the schemes considered have, of necessity, been examined from the viewpoint of their effect on the present system, which may be considered the nucleus of hydro-electric development in the Province.

Mr. F. J. Robertson, who had a wide experience in both steam and hydro-electric plants, is the company's general superintendent.

The Quebec Gazette announces the incorporation of Mertel Motors, Ltd., with a capitalization of $20,000. The new firm is authorized to manufacture and deal in electrical machinery, appliances, etc. The head office of the company is at Montreal.



Calgary Power Co., Horse Shoe Falls Development

City of Calgary Power Department

Steam Plant Supplements Purchased Hydro-electric—
Special Furnace Arrangements Allow use of Lignite Coal

By J. F. McCALL, Superintendent

The city of Calgary receives its supply of electricity from two sources; hydro-electric and steam. The hydro-electric power is supplied by the Calgary Power Co. from their plant at Kananaskis Falls, about 50 miles west of Calgary. The steam plant is owned and operated by the city. It is situated in Victoria Park on the bank of the Elbow River. The power house building, which is constructed of pressed brick and concrete is 250 feet by 133 feet. A fire wall, the full length of the building, separates it into two parts, the engine room 50 ft. wide, and the boiler room 83 ft. wide.

In the boiler room there are 20 Babcock and Wilcox water tube boilers:—twelve with 3580 sq. ft. of heating surface, four with 2823 sq. ft. of heating surface, and four with 6080 sq. ft. of heating surface. The boilers are set in batteries of two, on each side of a central firing aisle. All are equipped with Babcock and Wilcox superheaters and chain grate stokers.

The induced draft plant consists of two 106 in., two 120 in. engine driven fans, and two 120 in. fans connected by silent chain drives to two 3 speed a.c. motors. These fans are connected to two 8 ft. by 75 ft., and one 10 ft. by 90 ft. steel stacks. The flues are all underground.

Coal is unloaded into a track hopper, outside the building. From this hopper it is carried by a tray conveyor to the main bucket conveyor. The bucket conveyor elevates the coal to the overhead steel bunkers, which have a capacity of 600 tons. The same conveyor takes away the ashes, which are loaded into the bucket conveyor in the conveyor tunnel, and dumped into a tray conveyor, which in turn dumps an ash hopper of 15 tons capacity. The coal handling machinery has a capacity of 50 tons per hour. From the overhead bunkers coal is delivered to the stoker hoppers by 1000 lb. weigh larries.

Engine-Room Equipment

The engine room equipment consists of:

One 900 h.p., 3-crank Robb-Armstrong engine, 300 r.p.m., direct connected to a Dick Kerr Co., 600 kw., 550/600 volt d.c. generator.

One 750 h.p., 3-crank Robb-Armstrong engine, 300 r.p.m., direct connected to an Allis Chalmers Bullock, 500 kw., 550/600 volt, d.c. generator.

One 1500 h.p. synchronous motor, direct coupled to a 1000 kw., 550/600 volt, d.c. generator, 400 r.p.m., supplied by Dick Kerr Co., England.

One 1800 kw. and one 5000 kw. Parsons type steam turbines, connected to 60 cycle, 2300 volts, 1800 r.p.m. generators manufactured by Allis Chalmers Co., Milwaukee.

One 2500 kw. Curtis Rateau type steam turbine, manufactured by Belliss Morcom, Birmingham, Eng., connected to 60 cycle, 2300 volt, 1800 r.p.m. Vickers generator.

The exciters are one 100 kw., 120 volt, 290 r.p.m., steam-driven unit, Robb-Armstrong engine, Can. Westinghouse generator; one 50 kw., 120 volt, 290 r.p.m., steam-driven unit, Robb-Armstrong engine, A. C. B. generator; one 100 kw., 120 volt, 520 r.p.m., motor-generator unit.

Condensers

The main units are equipped with surface condensers, the condensers with their respective air pumps being placed in the basement directly under the units which they serve. Condensing water is supplied from the Elbow River by two 5000 gallon per minute, Mather & Platt centrifugal pumps at 35 ft. head, driven by 2300 volt C.G.E. motors, and one 3500 gallon per minute centrifugal pump built by John Inglis Co., driven by a 2300 volt Swedish General Electric motor.

The condensate from the turbines is pumped through a recorder, and from there flows by gravity to either of two open feed water heaters.

Feed water is supplied to the boilers through a Venturi meter by two Jeansville, 3-stage centrifugal pumps driven by Terry steam turbines at 2750 r.p.m., by one Worthington vertical duplex pump, size 12 in. by 8½ in. by 10 in., and by one Fairbanks Morse vertical duplex pump, size 10 in. by 6 in. by 12 in.

Distribution Lines

Power from the hydro-electric plant is transmitted to Calgary at 55,000 volts, over two separate transmission lines to the company's terminal station in East Calgary. At this station the current is stepped down to 12,000 volts for distribution to the city's high tension lines. Power is supplied to the city over 12,000 volt lines as follows:—one line leading to No. 2 sub-station, Ogden, two lines leading to central power station, and a ring main circling the city to supply the different sub-stations. The central station is also connected to the sub-stations by 12,000 volt feeders.

Mr J. F. McCall

The electrical controlling equipment at the central station consists of a 12,000 volt and a 2300 volt bus situated in the north end of the engine room basement. Each phase of these buses is placed in a separate concrete compartment, and the outgoing and incoming leads are separated by concrete barriers. Normally the buses work as a complete unit, but it is possible by the use of sectionalizing switches to cut out sections of the bus without interrupting the service. The two buses are connected together through three 3000 kv.a., 12,000/2300 volt, 3 phase transformers. The switching equipment for the main buses is placed directly over the bus on the engine room floor. There are 17 C.G.E., type F.H., 20,000 volt circuit breakers.

Main Control Board

The main control board is mounted on a concrete and steel gallery, 70 ft. by 12 ft., supported by iron columns. This board consists of 25 black slate panels. It is equipped with the standard instruments, including power factor recording, and integrating watt meters, frequency meter, automatic synchronizing equipment, and overload and reverse current relays for the steam turbines. At the back of this board is an auxiliary board containing the feeder relays, and the control equipment for the 125 ampere hour storage battery, used for switch control. Below the main board is a skeleton bus structure for the local feeder bus. This bus is fed through a set of reaction coils from the main 2300 volt bus. All feeder switches are controlled from the main board by hand operated remote control switches. All outgoing power and light feeders are equipped with voltage regulators, which are placed in the basement, as is also a nine panel control board for house service and street lighting. This board was manufactured and set up by the city electrical department for the design and under the supervision of Mr. R. A. Brown, electrical superintendent.

The Sub-stations

Sub-station No. 1, situated at 9th Avenue and 7th Street West, has two 1500 h.p. auto-synchronous motors direct connected to two 1000 kw. 550/600 volt, d.c., generators for street railway service. These machines were manufactured by the Swedish General Electric Co. This station also contains the necessary 12,000/2300 volt transformers, and equipment for the control of light and power for this section of the city.

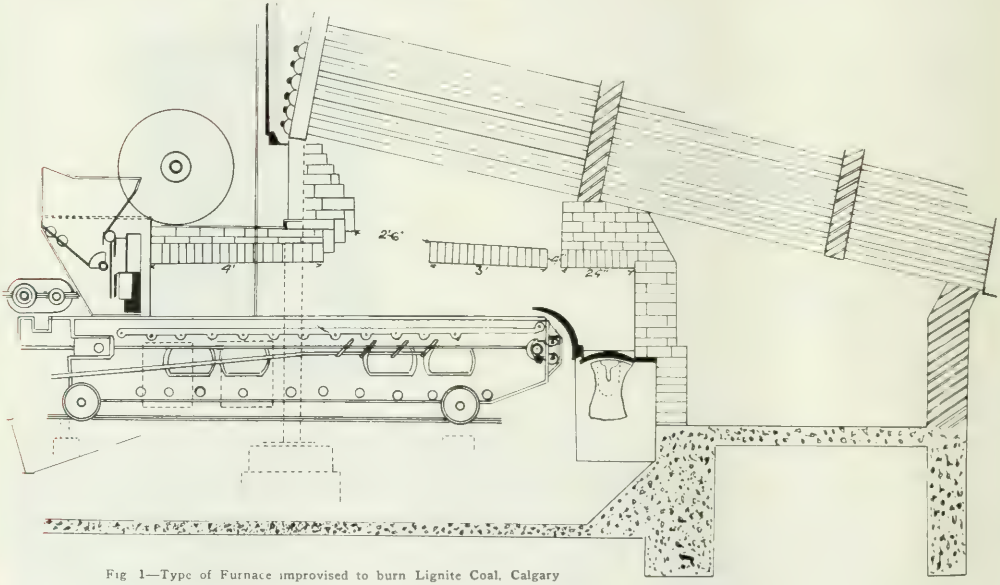


Fig 1—Type of Furnace improvised to burn Lignite Coal, Calgary

Sub-station No. 2, contains one 750 h.p. synchronous motor, driving a 500 kw. 550/600 volt, d.c. generator supplied by the Dick Kerr Co., England. This station also contains the control feeders supplying the C.P.R. locomotive and car shops at Ogden.

Sub-station No. 3, has one 1500 h.p. synchronous motor direct connected to a 1000 kw., 550/600 volt, d.c. generator, and one 1,000 h.p. synchronous motor direct connected to a 750 kw., 550/600 volt, d.c. generator. Both these machines were supplied by the Canadian Westinghouse Co.

Purchased Power

Power is purchased form the Calgary Power Co. on a horse-power basis, the normal load purchased being approximately that required from midnight to 6 a.m. Under this system we are able to shut down our steam turbines from midnight to 6 a.m.; it also gives us a very high load-factor for our purchased power. From 6 a.m. to midnight the steam plant takes all the peaks above the hydro-electric normal load with a certain reserve for emergency purposes. At times, owing to ice trouble or snowslides in the mountains, and to lightning storms during the spring and early summer, the steam plant may be called upon at short notice to take a considerable portion of the load. The plant capacity is sufficient to handle the total city load for a reasonable length of time.

Burning Lignite Coal

The opening up of the Drumheller coal fields made available a considerable quantity of lignite slack, if it could be burned with satisfactory results. This fuel averages about 11,500 B.t.u. per pound of dry fuel, and contains from 12 per cent to 20 per cent moisture. Efforts were made to burn this fuel on chain grate stokers for some time without success. Owing to the excessive moisture, it was impossible to ignite the coal until it had passed about three feet into the furnace. The solution of the problem depended on the radiation of sufficient heat back towards the coal gate of the stoker to dry the moisture out of the coal. After several trials the type of furnace illustrated in Fig. 1 was ob tained, and has since given very satisfactory results.

In the alterations to this furnace the bridge wall was moved back 18 inches, and an 18 inch sector was removed from the sides of the stoker, and the stoker moved this distance under the boiler; with this change a better arrangement of arches was obtained.

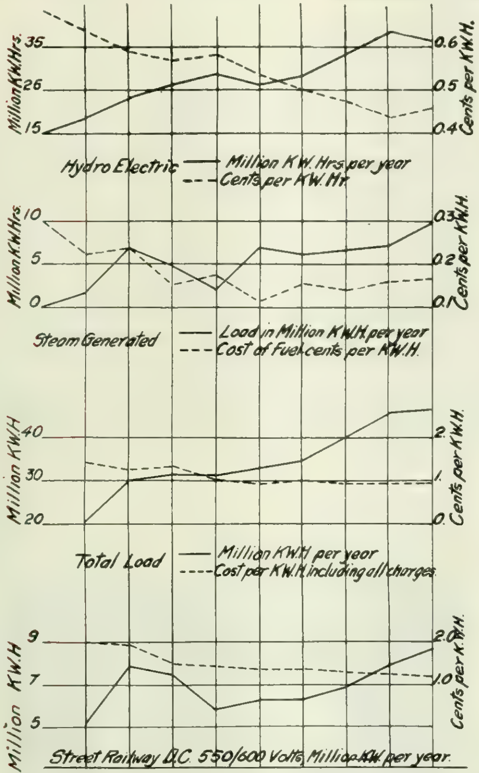


Fig. 2—The Story of Calgary's Power Load

This furnace has given very satisfactory results, and it is possible to burn coal containing 23 per cent moisture, working the boilers at 110 per cent of rating. Under ordinary operating conditions 125 per cent of builders' rating is obtained with coal containing 16 per cent moisture and in emergency as high as 175 per cent rating has been obtained.

The question is often asked, "Do not the flames, passing through the 2 ft. 6 in. opening between the arches, have a destructive effect on the tubes?" The answer is "No." The records of tube renewals in the plant show that in five years with 20 boilers only two tubes have had to be replaced.

Historical

The city started their first electric light plant in 1905 with one 250 kw. generator direct connected to a Robb-Armstrong Corliss cross compound engine, and two B & W water tube boilers. This plant was situated on 9th Avenue West. The plant immediately began to grow, and in 1909 all the available space of that location was occupied, and early in 1910 it was seen that further extension would be necessary at an early date. The present location was chosen as the site of the new plant, and immediate steps were taken to get the plant under way. The new plant started in the spring of 1911, and shortly after power was obtained from the hydro-electric company. The last six months of 1911 was a period of transition. During this time the old station was being dismantled, and the machinery that was considered suitable was being erected in the new station. This was practically completed when the new station took over control of the operation in January 1912.

The growth of the electrical industry in Calgary from that date is indicated by the curves. The primary object, which the power department has in view at all times is continuity of service, with cost as a secondary consideration. Interruptions to the service are few and of short duration, while at the same time the operating and maintenance costs have shown a gradual decline. The present plant was designed and erected under the supervision of the writer, the superintendent of the Power Department.

How Calgary's Power is Distributed

Proportioning of Generating and Operating Expenses —Some Splendid Examples of Underground work.

By R. McKAY, Superintendent Electric Light

Calgary, situated at the gateway to the Kicking Horse Pass, on the main line of the C. P. R. about 80 miles east of that famous pleasure resort,—Banff, and surrounded by a fertile country recognized the world over for its grain growing and cattle raising possibilities, offers to manufacturers and industrial enterprises, in addition to low power rates and suitable industrial sites, all the advantages that could be obtained anywhere in the Dominion, together with local advantages peculiar to this section.

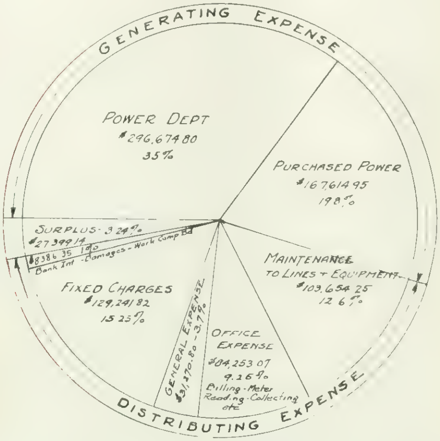
Calgary's public utilities are municipal enterprises, and are representative of what can be accomplished under public control. Previous to 1905 the rate for lighting purposes was 18 cents per kw.h. The city began operating their electric light plant in 1905 and the rates were reduced to 14 cents per kw.hr. for lighting and 10 cents per kw.hr. for power. To-day lighting rates go as low as 2.8 cents per kw.hr. and power as low as ¾ cents per kw.hr. The total capitalization of the electric light and power department is $2,949,480.22 In addition to this $369,393.57 has been spent in improving the plant and equipment, and has been financed from surplus revenue.

Hydro power is secured from the Calgary Power Company, whose generating site is located about 52 miles west on the Bow River at the Horse Shoe and Kananaskis Falls, and is transmitted to Calgary by two transmission lines at a difference of potential of 55,000 volts to the company's sub-station located within the city limits, where it is distributed to the city's various sub-stations at 12,000 volts.

The standard primary distribution voltage is 2300, and the standard voltage for power service is 220 volts, 3 phase, 60 cycle. All primary feeders are underground to the center of distribution, then overhead—with the exception of the business portion of the city, where all distribution is underground.

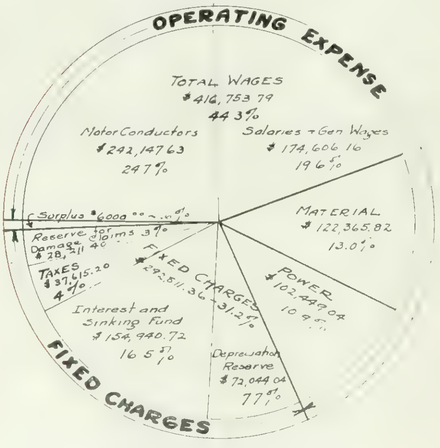
The underground system consists of 116.8 duct miles of vitrified clay; 375 standard manholes 6 x 7 x 6; and 25 transformer manholes 9 x 14 x 7. These manholes are drained to gravel. It has been found unnecessary to drain to sewer owing to the porous nature of the soil. 25137 feet of 3 conductor, 2/0 cm. paper insulated, lead covered cable is used in carrying 12,000 volt current to sub-stations located in the center of the city, 49625 feet of 300,000 cm., 3 conductor, paper insulated, lead covered cable is used for primary distribution, and 25,034 feet of secondary paper insulated, lead covered cable. All arc circuits are underground from the sub-stations to the center of distribution and 29,204 feet of 2-conductor, 6,000 volt, paper insulated, lead covered cable is used for this purpose. In addition to the foregoing there are street railway feeders and returns, police patrol, and fire alarm services, all of which to a certain extent are underground.

$831,829.67 — How it Goes — 1920



Calgary Municipal Electric Light Dept.

$940,380 — How it Goes — 1921



Calgary Municipal Railway System

Underground primary switching and sectionalizing is done through the use of G. & W. primary sectionalizing boxes, and Westinghouse, C. G. E. and Conduit manhole type oil circuit breakers. On secondary distribution G. & W. six way 600 amp. secondary boxes are used, in addition to a 6 way secondary box which is made up locally.

176 C. G. E. 6.6 amp. ornamental magnetite lamps are used in lighting the main business portion of the city and 2,000, 6.6 amp., 250 c.p. to 1,000 c.p. lamps are used in lighting up the avenues and streets of the city. Ordinary mast arms and goose necks are used, and in the majority of cases converted pendant magnetite and a.c. arc lamp cases are used as fixtures. Five light ornamental standards are installed on several of the streets and avenues, but it is anticipated that they will be changed in the near future to single light standards of higher unit capacity.

The ring system is used in feeding outlying districts. This ring is 16 miles long, 12,000 volt, 3 phase, 60 cycle, and five sub-stations are fed off it. No. 1. sub-station in the center portion of the city is fed underground by two 12,000 volt, 3 conductor, paper insulated, lead covered cables.

Connected to the city lines are 16,184 lighting services, 20,129 connected h.p. motor load, (in addition to this load all the water works pumping station equipment is electrically driven and amounts to about 1500 h.p.), 682,801 lbs. of copper is used for overhead primary distribution, 21,550 kw. in service transformers, and 290 miles of pole line.

Typical Transformer Manhole, Calgary

During the year 1921 8,728,649 kw. hrs. were sold for lighting purposes, 15,594,966 kw. hrs. for power purposes, 8,240,010 kw. hrs. to the street railway, and 2,825,920 kw. hrs. were used for arc lighting. The department will show a surplus of about $50,000.00 for the year ending December 31st, 1921.

Power rates vary from ¾ cent to 2 cents per kw. hr.; the lighting rates from 3 cents to 6 cents per kw. hr.; heating 1-¾ cents to 2 cents per kw. hr. A minimum charge is made, but no standby or other charge is imposed A discount of 10 per cent. is allowed on all accounts for prompt payment.

Electrical Supply in City of Saskatoon

Has Established an Enviable Record for Continuity of Service. Total Cost of Production 2.77 cents per Kw.h.; Average Selling Price 3.28 cents.

By J. R. COWLEY, City Electrical Engineer

Saskatoon, in the province of Saskatchewan, is a city of about 25,600 inhabitants, its population having increased from 113 in the year 1903. The demand for electricity has kept pace with the increase in population, the original power plant constructed in 1907 having to be replaced by one of considerably increased capacity in 1912. The present plant is housed in a building of fireproof construction, located on the north bank of the South Saskatchewan river and situated within half a mile of the centre of the city.

Engine and Boiler Rooms

The engine room contains three turbo-generators of 5,000, 3,200 and 2,200 kw. rating as well as two 75 kw. turbo-exciter units, all power being generated at 2,300 volts, 60 cycle, two phase. The condensing equipment is located in a basement extending the full length of the engine room, each turbine having its own surface condenser along with the necessary air and condensate pumps; the latter being in most cases motor driven.

Eight 500 h.p. Babcock and Wilcox boilers, arranged in batteries of two, supply steam for the turbines, each boiler being fitted with B. & W. chain grate stokers arranged in a special furnace setting for the combustion of lignite slack coal. This coal carries about 16 per cent of moisture with a B.t.u. value of 9,500 and the results obtained in combustion have been very satisfactory. The steam pressure is 150 lbs. superheated 100 deg. F., and each boiler is fitted with a CO_2 recorder, differential draft gauge and steam flow meter.

Coal is handled by means of a bucket conveyor with ovehead storage and gravity feed; ash removal is by means either of the conveyor or by steam suction.

Each battery of boilers has also its own economizer, the boiler feed being handled by turbine and reciprocating pumps from two open type water heaters.

Induced draft is used and is provided for by two motor driven and two steam driven fans, any one of which is capable of producing draft for four boilers.

Switchboard

The original switching equipment installed in 1912 had to be entirely replaced in 1916. The present switchboard is of the remote controlled type operated from a benchboard situated on a gallery overlooking the engine room. All high tension switchgear is contained in concrete cubicles, the generator switches being located in the basement and the selector and feeder switches on the engine room floor. Provision has been made for 12 feeders of which 10 are in use at present. The feeders are arranged in groups of four, each group being separately protected by selector switches fed from the main bus bars, which are in duplicate.

For traction purposes there are installed two 300 kw. motor-generators and one 600 kw. Bruce Peebles convertor all of which are controlled from a 7 panel traction switchboard situated on the switching gallery. The two 300 volt switching in this case is done by means of manual remote control switchgear.

Percolating Water Supply

Cooling water for the condensers is pumped from the river by means of centrifugal pumps installed in a pump house located on the river bank, the capacity of same being 5,600, 5,000, and 3,600 gallons per minute respectively, all

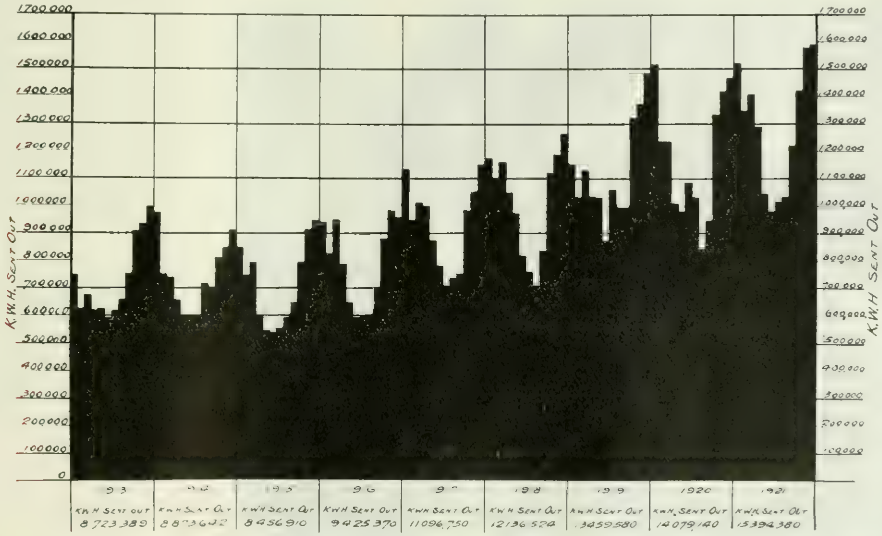
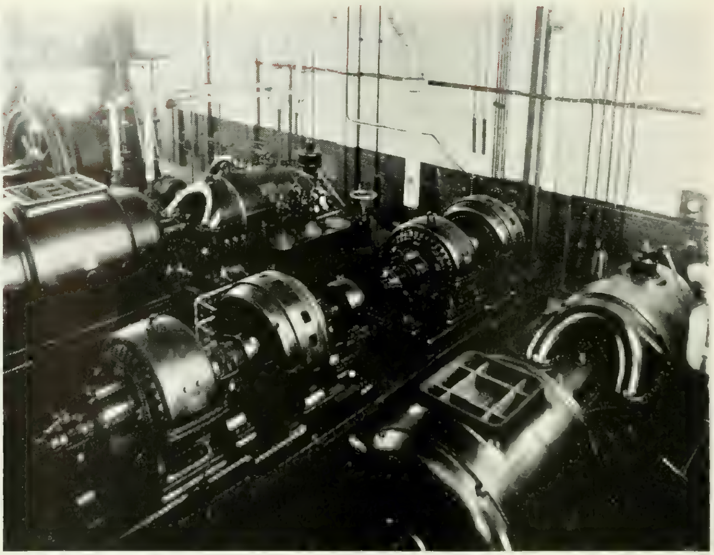


Chart Showing Output in Kw.h. per month from 1913 to 1921—City of Saskatoon

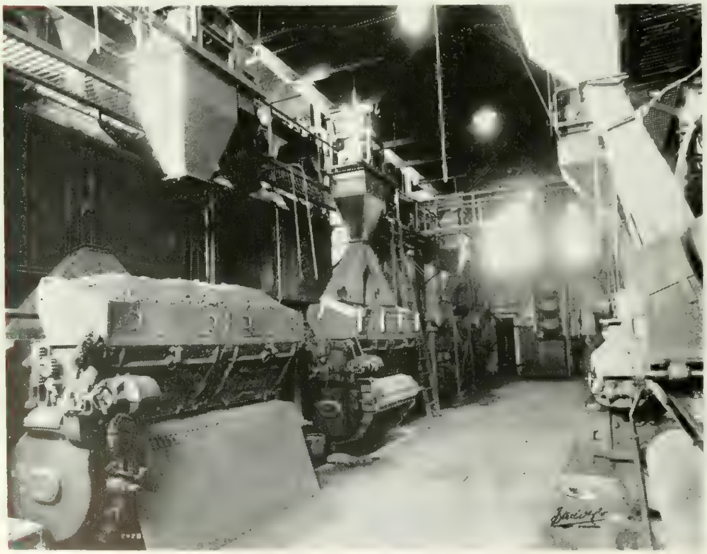


Interior of Power Plant, City of Saskatoon

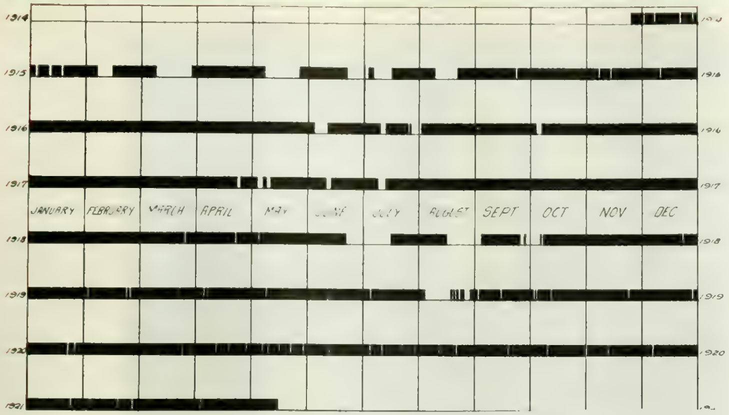
being direct driven by 2,200 volt motors.

The design of the intake well will show some features which may be of interest, and in this connection the general design is shown on sketch plan. Originally the circulating water was pumped from the well shown in the centre, which drew its supply from a 24 in. intake pipe extending into the river, but with increased demands for water this installation became inadequate and the difficulties experienced from shortage of water and the necessity of frequent cleaning out of well and condensers due to large deposits of sand and foreign matter made it desirable to increase the capacity as well as make arrangements to cope with the condition of the river water which at certain periods of the year carried large quantities of sand and other foreign matter in suspension.

In order to obviate these troubles an outer well was constructed and divided into two halves, each half separately fed from a new duplicate intake pipe. Gate valves were installed at the entrance to the outer well and openings for valves and screens were made in the inner well wall at a



Boiler Room, City of Saskatoon Power Plant



Performance Chart of 3,200 Kw. Generator, Saskatoon. Non-stop runs—October 6th, 1916, to April 22nd, 1917—June 12th, 1917, to March 24th, 1918

point furthest away from the intake; suction drop legs being also installed so as to pull water directly from the outer wells when desired.

By this method the water flows through each or both halves of the outer well at a low velocity thus depositing its sand, while foreign matter is caught on the screens before entering the inner well. The result has been very successful in operation as water may be drawn from either of the three wells, and accumulated deposits of sand can be removed at leisure without affecting continuous operation.

The institution of a closed syphon system has also reduced the working pressure of the pumps from 70 to 50 feet of total head.

Maintaining Continuous Supply

The city plant has been particularly fortunate in the maintaining of a practically continuous supply of current since 1913, and as a matter of interest a performance chart of the Westinghouse 3,200 kw. turbo-generator indicates the remarkable reliability of the modern steam turbine. The longest non-stop run of this unit was from June 12th, 1917, to March 24th, 1918, and the current generated during the period amounted to 9,943,650 kw.h.

In order to relieve this unit and provide a greater factor of safety, an additional 5,000 kw. Westinghouse turbo-generator was installed in the early part of 1921, this unit superseding a 750 kw. reciprocating set installed in 1912.

The difficulties in the installation of this unit were increased owing to the removal of the solid concrete foundation of the old set, and the fact that the lowering of the basement level necessitated the underpinning of the engine room walls by reinforced concrete.

All work in connection with the installation of this unit was carried out by the power house staff, the erection being supervised by the Westinghouse company's erecting engineer.

The steam consumption guarantees of this unit are as follows:—

5000 kw.	14.95 lbs.
4000 kw.	14.5 lbs.
3750 kw.	14.55 lbs.
2500 kw.	15.55 lbs.
1250 kw.	19.7 lbs.

Tests carried out since the installation have shown the consumption to be rather better than that guaranteed.

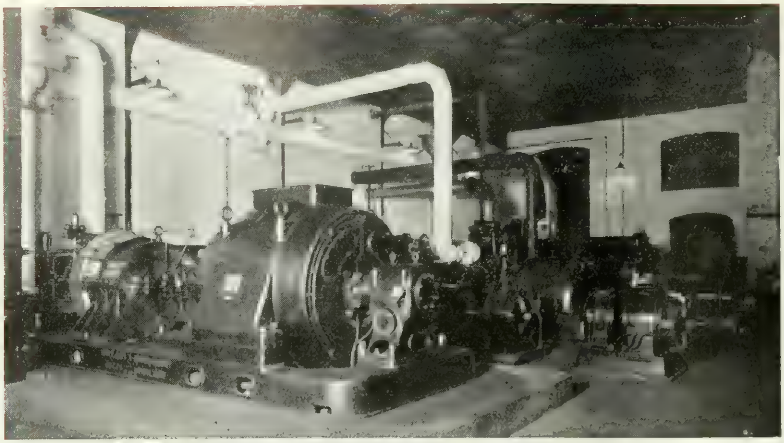
During the past year the total kw.h. sent out amounted to 15,394,380, of which 14,072,845 were sold at an average price of 3.28 cents per kw.h. sent out. The total cost of production, inclusive of distribution, and fixed charges, amounted to 2.77 cents or an overall profit of $77,735.07.

The number of meters in service at the end of 1921 were as under:—

Domestic Light	5591
Domestic Power	325
Commercial Light	1273
Commercial Power	367
Total	7,556 meters

The following table shows the distribution of current sold during 1921 as well as a comparison to the revenue obtained:—

	Kw.h. Sold	Revenue	Percentage of Total kw.h. Sold	Percentage of Total Revenue	Revenue per kw.h Sold
Domestic Light	1,558,910	127,535.42	11.1	25.5	8.18
Commercial do.	2,105,865	145,090.34	15.1	29.0	6.89
Domestic Power	607,190	16,733.89	4.3	3.4	2.76
Commercial do.	1,425,956	70,771.74	10.1	14.1	4.96
General City Accounts Light	75,717	4,836.44	.54	.9	6.38
Power	88,850	2,547.68	.63	.5	2.87
Street Lighting (Metered)	301,215	9,084.01	2.14	1.8	3.02
Street Lighting (Arcs)	655,560	22,544 15	4.65	4.7	
Pumping Plant	1,217,981	18,256.79	8.56	3.6	1.5
Street Railway	2,034,580	30,518.70	14.45	6.1	1.5
Manufacturing (Flour Mills etc.)	4,001,021	52,475.07	28 43	10.4	1.31
	14,072,845	500,394.23	100 per cent	100%	



South end of turbo-generator room, Moose Jaw

Moose Jaw Plant is New and Modern

Following fire in 1912 fine new equipment and buildings make this one of the most economical plants in the Middle West

By J. D. PETERS, Superintendent

The Corporation of Moose Jaw first entered into the light and power business in 1904, and no better evidence of the rapid development of the West can be found than is represented by the growth of this business.

The plant with which the city first started in the central station industry consisted of a 100 kw. engine-driven (belted) 2 phase, 2300 volts, 60 cycle generator, and two boilers of an antiquated type. In the years following, up to 1910, this equipment was replaced by a 225 kw. direct connected, Westinghouse engine-driven set, and two B. & W. water-tube boilers, and one 225 kw., Allis-Chalmers Bullock generator, driven by a Robb-Corliss engine; also a 500 kw. General Electric vertical type steam turbine was added, along with two additional boilers.

In May, 1912, this plant, with the exception of boilers, was destroyed by fire, and a new plant built upon the same site, operating one unit in less than ten weeks after the fire, but the real construction work was carried out after service was re-established. The new plant was very much more modern than the old, and comprised one 500 kw., and one 1,000 kw., General Electric, 3 phase, 2300 volt, 60 cycles, 3,600 r.p.m. steam turbo-generators, which are equipped with surface condensers, steam and motor driven exciters, etc., and four 250 h.p. Babcock and Wilcox boilers, equipped with superheaters and chain grate stokers. Sturtevant economizers and induced draft fans were also installed.

New Building and Equipment

The new building was of brick and steel construction and fireproof throughout, and laid out for three turbo-generator sets, of 3,000 kw., total capacity. In 1913 and 1914, the third unit, consisting of a Willans & Robinson turbine and Siemens generator of 1500 kw. capacity and 3,600 r.p.m., was installed. At about the same time four Babcock and Wilcox boilers of 375 h.p. capacity, each, were added, and also a coal and ash handling plant, consisting of tipple, crusher, and gravity bucket type conveyor, which conveyed the coal from the spur track about 90 ft., from the building and elevated it to the overhead coal bunkers. This same conveyor was used to deliver ashes from the ash pits to an elevated ash bin outside the building. No further extensions were made to the plant until the year 1919, when the 500 kw. turbo-generator set was taken out and one of 3500 kw. capacity, also of General Electric manufacture, 3600 r.p.m., was installed in the same space, bringing the total generator capacity up to 6000 kw., but no additional boilers were added. During the same year, steam-jet ash conveyors, supplied by the American Steam Conveyor Corporation, were

Mr. J. D. Peters

Year	Output of Plant	Yearly Load Factor	Total Revenue	Number Accts.
1911	1,427,500 kw.h.	13.9 per cent	$105,578.39	1979
1912	2,141,250 kw.h.	21.9	128,111.94	2960
1913	3,762,900 kw.h.	29.0	195,236.39	3450
1914	3,739,900 kw.h.	30.0	179,428.36	3126
1915	4,266,800 kw.h.	30.4	162,494.00	3489
1916	5,468,720 kw.h.	34.7	186,212.41	3760
1917	6,367,790 kw.h.	36.2	207,604.51	4027
1918	7,155,610 kw.h.	36.1	229,965.62	4184
1919	7,348,830 kw.h.	36.4	270,560.82	4602
1920	8,624,500 kw.h.	36.3	310,072.52	4759
1921	10,875,800 kw.h.	40.0	367,868.63	4910

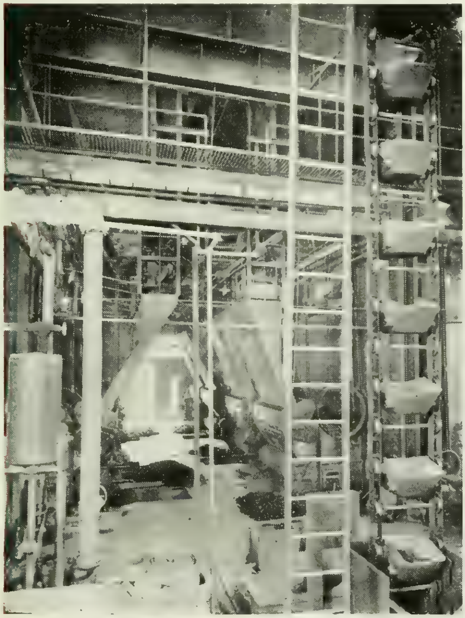
also installed to relieve the gravity bucket conveyor of this work and reduce the labor required in handling ashes.

The Switchboard

The switchboard was supplied by the Canadian General Electric Company in 1913, and also all additions made since that time. It is a very simple arrangement of remote mechanical control with no duplication of bus bars or switches, and no disconnecting switches, and has proven very satisfactory. The fact that in eleven years of continuous operation there has been only one interruption of service due to switchboard trouble, bears this out very well. As the plant capacity increased it was of course necessary to install circuit breakers of higher rupturing capacity.

The Street Railway Supply

The street railway is not owned by the city and up to February, 1921, the railway company produced their own power. At that time, the city entered into a contract to supply this power, and a 500 kw., 2300 volt synchronous motor-generator set was installed by the company in the city plant.



View of Boiler Room, Moose Jaw Light and Power Department

The auxiliary equipment also includes Weir boiler feed pumps, a Hoppes metering feed-water heater, Bailey coal meters and a Refinite water softening plant.

The Table above shows not only the rapid growth of this business but also a marked improvement in load conditions since the year 1910.

While this remarkable increase in plant output is partially accounted for by increase in population, as indicated by the increase in the number of accounts, the most of it is due to increased sales for power purposes. During the year 1921 the sale of electric energy was divided as follows:—

Commercial and Domestic Lighting	31.2 per cent
Electric Railway Operation	11.1 per cent
Manufacturing Purposes	40.0 per cent
All other Purposes	17.7 per cent

Electric cooking and heating is rapidly becoming an important part of the business, over eleven per cent of the gross revenue for the year 1921 being derived from this source. Very favorable rates are given for these purposes.

The city's schedule of rates is designed as nearly as possible, to give rates which are equitable as between different classes of consumers, and to give the consumer the benefit of high load factor and diversity in the use of energy.

Western coal is used entirely, principally from the Lethbridge district and very satisfactory results are obtained, the average fuel cost in the year 1921 (the highest for several years) being 1.15 cents per kw. hour sent out.

The street lighting system consists of 315 one thousand candle power, 20 ampere series gas filled lamps, and 48 five-light standards, 75 and 100 watt multiple lamps being used on these standards.

Light and Power Department

The Light and Power Department has been very successful, financially, during its existence and in addition to giving very low rates, considering the population served, and the geographical location, it has been able to provide interest, sinking fund and depreciation reserves, and has turned over to the city, surpluses which at the end of the year 1921 total about $90,000.00

The total investment to December 31st, 1921, was approximately $1,050,000.00.

During the last thirteen years, the construction and operation of the plant and distribution system has been carried out under the direction and supervision of the writer.

Electric Show, May 1-6

Our readers are again reminded of the Twin City Electrical Exhibition to be held in the Auditorium, Kitchener, Ont., during the week of May 1 to 6. Mr. Geo. A. Phillips is manager of this Exhibition and will gladly give information to inquirers. The object of the electric show is chiefly that the housewife, the farmer and the factory manager may become thoroughly acquainted with the almost innumerable electrical appliances that are now on the market, and which have been created to bring comfort, economy and prosperity to their users.

Edmonton Utilities Municipally Owned

Steam generated energy for power, light and street railway service —A total of 13,000 Kw. a.c. and 1150 Kw. d.c.—New unit illustrated

By W. J. CUNNINGHAM, Superintendent Power Plant

The power house and pumping station are municipally owned and are under the direct supervision of the power house superintendent. The buildings are situated on the north bank of the North Saskatchewan River, between 101st and 104th streets and are 270 feet apart. The plants have been altered and extended from time to time since first built as the needs of the city required. The original plant was placed in operation some time in 1891, the first part of the present pumping station was built in 1909 and the present power house about 1908. The old original buildings have been since abandoned, no building extensions being made to the power house or plant between 1913 and 1920.

Electrical energy is generated in the power house for street railway service and general lighting and power, including the power supplied to operate two high lift pumps in the pumping station. Steam is supplied from the power plant boilers to operate the steam pumps in the pumping station, and the circulating water for the condenser equipment in the power house is obtained from the low lift pumps in the pumping station so that the two stations are interdependent.

The building is about 140 x 256 feet and one storey in height, with a basement under the engine room. Walls are brick with brick wall between the engine room and boiler room. The engine room is concrete on steel beams.

Main Generating Units

The general supply from the generators to the station bus bars is 3 phase alternating current at 2,300 volts, 60 cycles, and direct current 550 volts. The main units are—one 5000 kw., a.c., 3,600 r.p.m., separately excited, Canadian General Electric generator, direct connected to Canadian General Electric-Curtis turbine, with surface condenser and steam driven auxiliaries; one 4000 kw., a.c., 1,800 r.p.m., separately excited Siemens generator, direct connected to Willans-Curtis-Parsons turbine with surface condenser and motor driven auxiliaries; one 2000 kw., a.c., 3,600 r.p.m., separately excited Siemens generator, direct connected to Willans-Curtis-Parsons turbine with surface condenser and motor driven auxiliaries; one 2000 kw., a.c., 3,600 r.p.m., separately excited Westinghouse generator connected direct to Westinghouse turbine wth surface condenser, and steam driven auxiliaries and motor driven condensate pump; one 750 kw., d.c., 550 volt, 285 r.p.m., compound wound, interpole Siemens generator, direct connected to Belliss & Morcom vertical triple expansion engine with surface condenser and motor driven auxiliaries, and two 400 kw., d.c., 550 volt, 350 r.p.m. Crocker-Wheeler generators, direct connected to Belliss & Morcom vertical compounnd engines with common condenser of the surface type and steam driven auxiliaries.—Total 13,000 kw. a.c., and 1,150 kw. d.c.

Exciters

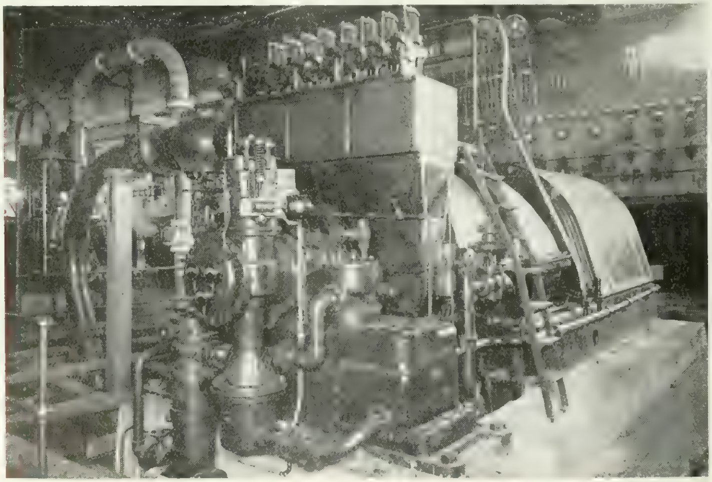
The exciters consist of one 100 kw., d.c., 125 volt, 500 r.p.m., Electric Construction generator connected direct to Howden compound, non-condensing engine; one 75 kw., d.c., 125 volt, 275 r.p.m., General Electric generator direct coupled to Goldie Ideal tandem compound non-condensing engine; one 1000 kw., d.c., 125 volt, Westinghouse generator direct connected to 2,300 volt Westinghouse induction motor—Total 275 kw. rated capacity.

Motor Generator Sets

These include one 300 kw., d.c., 550 volt, Westinghouse generator, coupled direct to a Siemens 2,300 volt induction motor; one 250 kw., d.c., 550 volt General Electric generator, connected direct to 2,300 volt General Electric induction motor;—Total 550 kw. rated capacity.

General Arrangement

The main generating units and boiler room are arranged

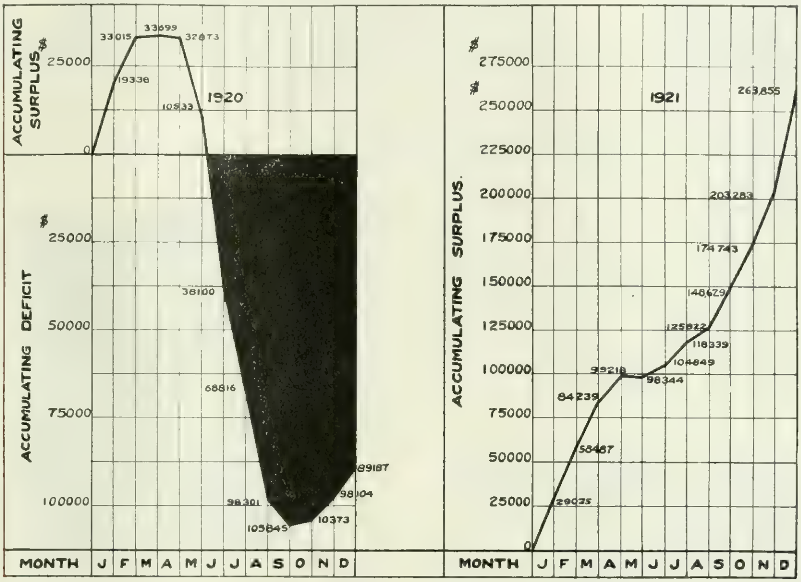


New Turbine Installed in Power Plant of the City of Edmonton back to back separated with a wall. The condensers and auxiliaries are placed in a basement below the engine room floor.

Boilers

There are 16 Babcock & Wilcox water tube boilers, aggregating 7,200 h.p., working under a pressure of 165 lbs., half of which are rated at 400 h.p. each and the other half 500 h.p. each. They are equipped with superheaters designed to give 125 to 150 degrees superheat when the boilers are operating at normal rating.

Firing is done with eight Babcock & Wilcox chain grate stokers in the case of the 500 h.p. boilers and the drive is arranged for two banks of four boilers. The equipment for each bank consists of a 10 h.p. motor and standby engine belted to a countershaft from which motion is given to the stokers. Two of the 400 h.p. boilers are provided with Westinghouse chain grates driven by an engine to a countershaft common to both boilers. The remaining six 400 h.p. boilers are hand fired. The boilers are double banked and face towards a central firing aisle.



Edmonton Public Utilities—Showing accumulating Surplus or Deficit 1920-21

Draft

The draft is produced mechanically and the equipment for the 500 h.p. boilers consists of a cold air Pratt ejector draft plant per bank of four boilers equipped in each case with a 45 inch Sirocco fan direct connected to a 90 h.p. motor, 550 volt, d.c., variable speed. The eight 400 h.p. boilers are served by a double fan Sheldon induced draft plant and each fan is driven by a 10 x 12 inch engine. Both the Pratt plants are located in a fan room at the north end of the boiler room and the Sheldon plant in a room at the south end.

The stacks are three in number, built of steel plates; two are of the Venturi type, 68 feet 6 inches high above the firing floor and 9 feet 10 inches diameter at the top, tapering to 5 feet 7 inches at the bottom; they are used in connection with the Pratt system. The third, for the Sheldon plant, is an ordinary steel stack, 80 feet high above the firing floor and 6 feet diameter. The main flues are constructed of concrete and run north and south under the boilers.

Handling of Fuel and Ashes

Two coal bunkers, one for the 500 h.p. boilers and one for the 400 h.p. boilers, are placed above the boilers central with the firing aisle. They have a total capacity of 1000 tons and are provided with chutes for supplying the stokers and hand fired boilers. The coal is delivered to the power house by rail and is unloaded to either of the two hoppers by a clam shell bucket locomotive crane. From the hoppers the coal is delivered to the bunkers by way of a tray and bucket conveyor. The equipment includes a coal crusher driven by motor. The removal of the ashes is by way of the basement under the boiler room floor.

Water is delivered for condensing purposes from the pumping station, delivered into a main header. The discharge from the condensers is into a main header with connections to the river and the sedimentation basin. The boilers have a source of supply from the city mains and direct from the pumping station.

A Paterson's water treating plant of the soda and lime type, treats the make up water and the condensate from the reciprocating engines. An open heater using exhaust steam is also provided for heating the water.

Four Weir feed pumps each capable of delivering to the boilers 7,540 gallons of water per hour when supplied with steam at 150 lbs. per square inch are installed. The feed lines connecting with the boilers form two complete loops either of which supplies water from the pumps.

Pumping Station

The pumping station is situated east of the power house.

is one storey in height and has an area of 12,400 sq. ft. The low lift pumps are situated in a pit about 40 feet deep at the south end of the building to bring them down to about the normal level of the river.

Low lift pumps include one W. H. Allen single stage centrifugal pump with a capacity of six million gallons per day against a head of 55 feet, direct connected to 105 h.p. Allen compound engine, condensing; one John Inglis two stage centrifugal pump with a capacity of six million gallons per day against a head of 80 feet, direct connected to 150 h.p. Belliss & Morcom compound engine, condensing; one W. H. Allen single stage centrifugal pump with a capacity of 18 million gallons per 24 hours against a head of 55 feet, direct connected to 307 h.p. Allen compound condensing engine.

Don't Operate Appliance Department

Edmonton municipality believes in leaving merchandising in the hands of the dealers—Gives both dealers and customers every co-operation

By W. J. MURPHY, Superintendent Light and Power Dept.

The field of operations of the Electric Light and Power Department is the distribution system, the street lighting and all commercial details relating to the consumer.

The class of power is 60 cycle, three phase, 2300 volts, purchased at power plant switchboard and distributed as 2200 volts and 220 volts, three phase power; 220/110 volt single phase lighting. The feeder from the power plant to the sub-station is 6600 volts.

The consumers connected on January 1st, 1922, were as follows: Three phase power, 399; lighting and others, 15,738. Total consumers 16,137.

Connected customers represent approximately twenty-five per cent of the entire population, i.e., one in four; approximately one hundred per cent of the houses adjacent to the electric light pole lines are connected for electric light service.

Three phase motors connected total 7,733 h.p.; meters for all consumers.

The rates charged are as follows:

Lighting

1-300 kw.h. at 8 cents per kw.h.
301-1000 kw.h. at 7 cents per kw.h.
1001-up kw.h. at 6 cents per kw.h.
Minimum charge one dollar per month.

Three-phase Power

(General three-phase power other than primary, 2200 volts).
1-300 kw.h. at 3 cents per kw.h.
301-1000 kw.h. at 2.5 cents per kw.h.
1001 and up at 1.5 cents per kw.h.
No bill issued for less than 3 h.p.; minimum charge, $2.25 per month.

Domestic Heating and Cooking

Same as 3-phase power, above.
Minimum charge:
Up to 2 kw. total connected load, $1.50 per month.
Over 2 kw. total connected load, $2.00 per month.

These rates are all subject to a discount of 5 per cent. Special rates are given where energy is consumed in wholesale quantities.

The street lighting lamps in service are: Tungstens, 1,319; pendant arc, 38; Whiteway, inverted arcs, 249; Total, 1,606.

The total energy purchased at the power plant switchboard for the twelve months ended December 31, 1921, for light and power consumers, and street lighting, was 16,792,500 kw.h.

New Feeder System

Construction will be commenced this year on the first section of a 13,200 volt feeder system and two additional sub-stations. Plans at present are for out-door sub-stations with probable change to regular indoor sub-stations, etc., when conditions warrant the expenditure at some future date.

Estimates have been approved for electric light pole lines extensions this summer, in various parts of the city, which will provide electric light service to about 150 houses not served at present.

Mr W. J. Murphy, Edmonton

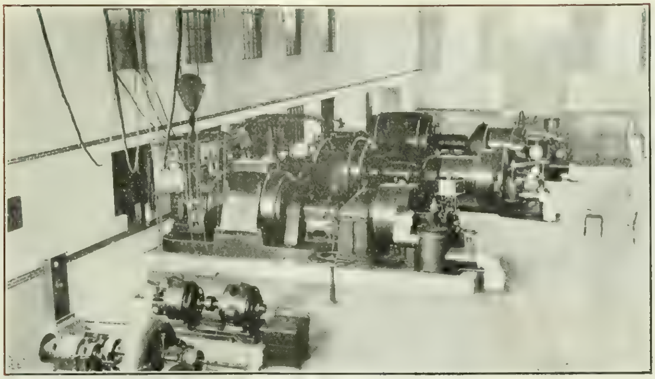
Financial

The department has for many years consistently shown a surplus after paying all operation and maintenance items and providing for all capital charges, such as sinking fund, interest, and depreciation. For the twelve months of 1921, this net surplus amounted to $114,200.

A regular programme of advertising is part of our general policy, such advertising covering goodwill, information about commercial details, electrical appliances and similar subjects. For this advertising we use the local press, a civic bulletin in the street cars, and also the reverse side of our electric light bills.

Merchandising Electrical Appliances

The department does not operate a merchandise department or store or sell appliances. We endeavor to give all information possible, and encourage the customer to apply to us for same. We will also assist the customer in selecting suitable appliances for their needs, but for actual purchasing we refer them to the regular stores.



General view of Turbine Room, Regina

Mr. E. W. Bull

Electricity in Saskatchewan's Capital

Fine record of continued growth and low generating costs in face of mounting expenditures—Some interesting views of the plant

By E. W. BULL, Superintendent

The City of Regina arranged for operating its own electrical utilities and purchased a small privately owned plant and distributing system in 1904. This plant was old and consisted of a 100 h.p. Brown engine, belted to two 375 kv.a., 1100 volt, 133 cycle, single phase alternators and a more modern plant was designed by Mr. Jno. Galt, C. E., who equipped the whole city with sewerage, waterworks and electric light.

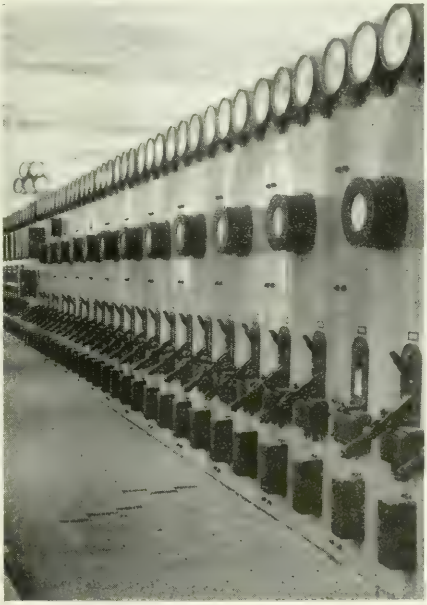
The plant located on the corner of Broad St. and Dewdney Ave. commenced operation in March, 1905 and consisted of a 300 kw., 2200 volt, three phase, 60 cycle, Westinghouse generator, direct connected to a 150 r.p.m. Inglis Corliss engine. This plant, although considered modern at the time, was arranged for non-condensing operation and operated from dark until daylight and was too large for the load. During 1907 a regular twenty-four hour service was inaugurated and motors commenced operating on printing presses and various machines in the city. To economically carry the light load a 100 kw. Westinghouse generator direct connected to a 277 r.p.m. Goldie Ideal engine was installed and a condenser was put in using city water and a cooling basin for circulating water.

There followed a growth of business and in 1909 additional equipment consisting of a 500 kv.a. Westinghouse low pressure turbine (the first to operate in Canada) was installed, using the exhaust of the 300 and 100 kw. engines.

In 1911 a street railway power supply was met by installing a 400 kw., 600 volt, Belliss Morcom, Siemens unit, running at 350 r.p.m., and additional B & W boilers to supply steam. A 1500 kw. Willans and Robinson, Siemens steam turbine unit was also installed to meet the regular a.c. load and a spray system for cooling circulating water was installed.

The electric load continued to grow very rapidly and in 1912 and 1913 a new plant with site near a body of water, was considered necessary and the foundation for building and machinery was completed in the fall of 1913 and a 1200 kw. motor-converter (LaCour patent) was installed in No. 1 plant converting 2200 volt a.c. power to 600 volt d.c. power for railway operation. This new plant is located at the corner of Winnipeg St. and Douglas Ave. on the shore of Wascana Lake and was to carry a load of 16,000 kw. and to have all essential parts of plant in duplicate and is fitted with economizers and underfeed stokers.

The engine room was designed for six machines and



Main Switchboard, Regina Municipal Plant boiler room for a total of sixteen boilers, fitted with mechanical stokers.

At present four machines are installed, consisting of 2-1500 kw. turbines, (one moved from No. 1 Power House), 1-3000 kw., all Willans & Robinson, Siemens units and a 5000 kw. General Electric Curtis turbine, leaving space for two more machines.

As Regina is located very far from any reliable source of water power a special effort to secure economical generation of power from coal has been made and the expensively produced energy has been distributed over a system made as efficient as consistent with the cost of producing power. The results obtained from No. 2 plant are such that a kilowatt hour is generated with a heat consumption of 27,000 B.t.u. in coal as fired.

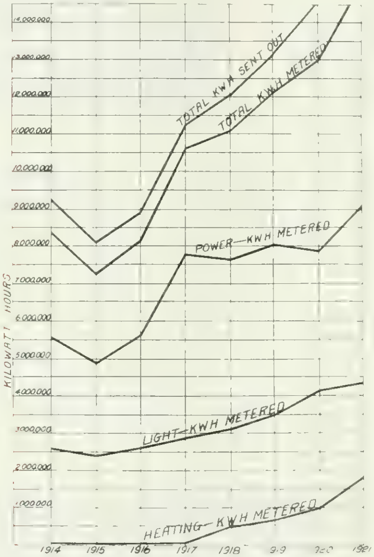
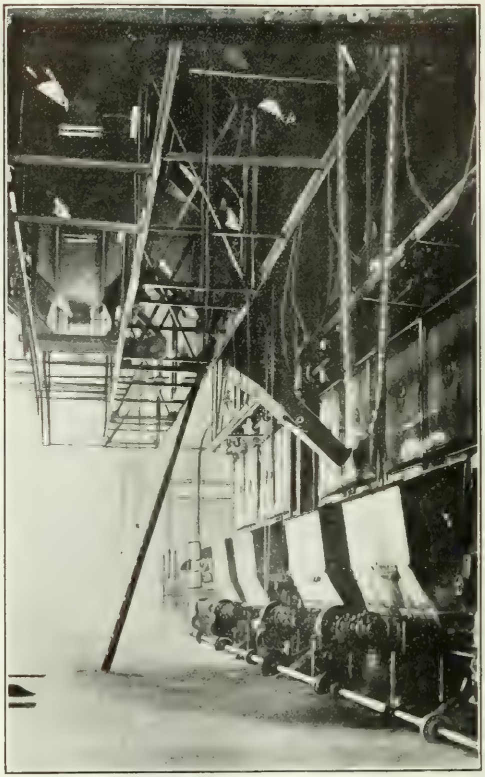


Chart of Output of Electric Light and Power Department, Regina

The distributing system uses the old power house (No. 1) as a sub-station for street lighting and street railway power as it is located close to the centre of load as well as supplying all street railway power and street lighting from this point and the motor converter is used for power factor control. This distributing system consists of 125 miles of pole lines and supplies over 8000 consumers, 650 street lamps which light 81 miles of streets.



View of Boiler Room, Regina

The amount of energy sent out from the plant as well as that registered on various classes of consumers' meters is shown in the following table, which covers eight years' records.

The McDonald & Willson Lighting Co., Ltd., 313 Fort St., Winnipeg, Man., has been awarded the contract for electrical work on a school being erected at Windsor Park, St. Vital, Man., at an estimated cost of about $42,000.

Table I—Energy Generated, Etc.

Year	Kw.h. sent out from plant	Fuel Cost per ton	Cost in cents per kw.h Fuel	Total generating	Total distribution	Overhead charges	Total cost	Total revenue
1914	9,315,355	$6.09	1.41	2.03	.51	.87	3.41	3.67
1915	8,255,275	5.25	.77	1.18	.41	1.42	2.95	3.58
1916	8,902,242	5.00	.72	1.04	.31	1.41	2.76	3.40
1917	11,396,674	6.10	.93	1.32	.30	1.04	2.66	3.10
1918	12,004,705	7.00	1.18	1.83	.34	1.03	3.20	3.08
1919	13,148,860	7.98	1.11	1.62	.34	1.07	3.02	3.22
1920	14,626,275	9.09	1.53	2.33	.39	.99	3.71	3.58
1921 (10 mos.)	13,264,770	9.09	1.20	1.85	.35	.93	3.12	3.42

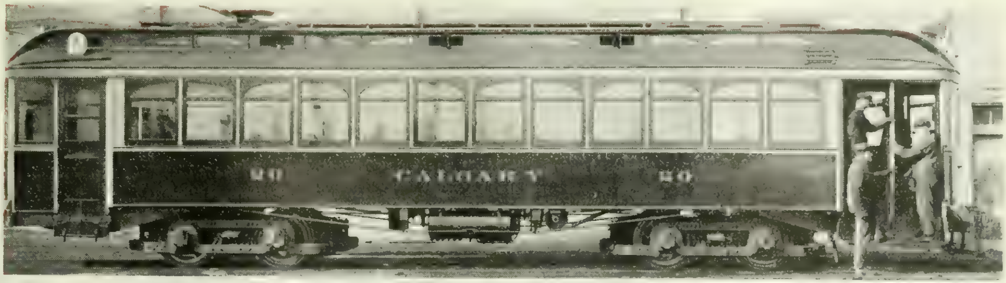


Fig. 1—Standard Type of One-man Car used in Calgary, Alta.

Electric Railway Operation in West

Western systems, in common with rest of world, hard hit in past five years—The one-man car as the economic solution

By R. A. BROWN,
General Manager Calgary Street Railway, Light and Power

In 1917 the Calgary Municipal Railway started operating one-man cars. The existing single and double truck cars were rebuilt at a small cost for one-man operation according to patents owned by Supt. McCauley. Since that time we have had no experience which would make us regret the change, in fact, we believe it has been the economic solution of our difficulties.

It seems to be the opinion of railway officials in many large cities that one-man car operation is suitable only for systems, or parts of systems, on which traffic is light. The safety car is responsible, I believe, in a large degree for this opinion. This car which has been developed primarily for one-man operation is a single truck car and accomodates a small number of passengers. By decreasing the headway between cars railway operators plan to handle rush hour traffic. But the wages of motor-conductors is a big item in railway operation costs, and of late years it has become a very serious item, so that putting on more cars does not solve the problem.

We believe that there is a limit in density of traffic which one-man cars can handle expeditiously, but would perhaps place that limit somewhat higher than other officials. We feel that we are a step in advance of systems using the safety car. The photographs show the long double truck comfortable riding cars used in Calgary. They handle the traffic at all hours of the day at schedule speeds from 9 to 11 miles per hour. During the evening rush hour a very high percentage of the traffic originates in the down town section, and cars are loaded to full capacity just as rapidly as two man cars were loaded.

The rapid loading of cars is necessary for the success of one-man operation, and it would perhaps be of interest for me to tell how it is done in Calgary. In the first place all the cars have an entrance door and an exit door. Passengers can leave at the same time that other passengers are boarding the car. Long vestibule cars have both doors in the side of the vestibule, while short vestibule cars have one door in the side and the other in the nose of the vestibule as the photograph shows. Making the cash fare 10 cents and selling tickets 4 for 25 cents and 18 for $1.00 has resulted in reducing the cash fares to an insignificant amount; this relieves the motor-conductors of a large amount of change-making. Tickets can be purchased at other places than on the cars. The abuse of transfer privileges has been eliminated as much as possible. This all helps to relieve the motor-conductors of a large amount of work. Doors are operated by the mechanical arrangements shown in the figure.

While the safety features of the safety car are not to be criticized we have had no accidents which can be traced directly to the lack of safety features on our own cars. The rear vestibule is provided with an emergency exit which can be controlled from the front vestibule.

Table I gives the schedule speeds of some of the routes in Calgary.

Table I

	Miles per hour
Belt Line	9.3
Ogden Line (Rural)	14.0
South Calgary	10.2
Killarney	10.5
Sunalta	8.12
Manchester & North Hill	10.6
Red & White	10.8
White Line	9.8
Red Line	7.8
Tuxedo Park	9.65
Riverside	8.65
Sunnyside	10.05
Bowness (Rural)	14.00

It will be seen that they are quite high in a good many cases. The Belt Line for instance—a very heavy traffic line—operates at 9.3 miles per hour.

We have answered many questionaires for other cities on the subject of one-man car operation. Some officials seem to be worried about the operation of the cars over railroad crossings. Calgary is fortunate in having subways or overhead bridges at points where the street railway crosses steam railroads. There are only two or three grade crossings, and these are over unimportant steam road switching tracks. I see no reason why the one-man car should not be as safe at grade crossings as the two man car, if efficient trolley guards are used to prevent the trolley from coming off.

As to the matter of accidents, our statistics show that one-man car operation reduces the number of accidents.

The circular graph shows the distribution of operating expenses and fixed charges. We believe a study of the amounts will satisfy the critics of municipal ownership that taxes, depreciation, and other fixed charges are being properly cared for.

Miscellaneous Statistics 1921

Miles Operated	2,899,036
Hours Operated	295,820
Passengers Carried	15,629,275
Revenue per Car Mile	32.437 cents
Oper. Exps. per Car Mile, inc. Fixed Charges	32.231 cents
Oper. Exps. per Car Hour	$ 3.158
Cost of Power per Car Mile	3.498 cents
Average Fare per Passenger	5.827 cents
Average Daily Receipts	$ 2,576.38
Average Daily Oper. Exps.	2,559.94
Percentage of Oper. Exps. and Fixed Charges to Revenue	99.4%
Total Revenue	$ 940,380.01
Total Expenses	934,380.01
Approximate Surplus	6,000.00

While this article was intended to cover railway operation in the prairie provinces time has not permitted us to include any other than the Calgary system. This we feel is fairly representative of the systems in vogue in most western cities.

The railway buys power from the municipal power department at the following rates:

Service Charge, $2,300.00 per month.
1 cent per kw. hr. up to 400,000 kw. hrs. per month.
¾ cent per kw. hr. for all power over this amount.

In 1921 the average rate per kw. hr. was 1.26 cents.

The power department operates five sub-stations from which direct current is supplied to the railway. The sub-stations were so located as to help mitigate electrolysis, cut down the amount of feeder copper required, improve voltage regulation, and reduce distribution losses to a minimum. The sub-stations also distribute a.c. energy for light and power, including street lighting. The rate for railway power is so low that the power economies of the safety car do not assume such importance in Calgary as they would in cities with high power costs.

Calgary has a rather novel system of electrical distribution designed on the sectionalizing scheme. The switches used are C. G. E. type S. W. 4 automatic sectionalizing switch. Normally the trolley and feeder system are tied together, but in case of trouble the switches automatically isolate the section affected. This gives us the advantage of a sectionalized system with all the copper economy advantages of a tied in system. The switches work very well, and have given no trouble to date.

The line equipment failure have been reduced noticeably by a more frequent inspection and replacement of trolley wire. Most failures occur at intersections and under subways. By using special trolley wire at these points—wire that has high tensile strength and good wearing qualities—we plan to reduce failures to a minimum.

Calgary is in the same position as a great many western cities in the matter of track. We have 83 miles of single track serving a city of 65,000 people. The real estate booms of early days spread the city over a large territory—41½ square miles in our case. This is a tremendous handicap to the running of a financially successful railway. Most of the track was laid in a short period of years so that rebuilding of track is badly needed. We have already had to replace some of the special track work with solid cast manganese steel construction.

Utilities Commissioner Smith, Calgary

In the matter of track bonding we believe that a well bonded track is better, and certainly less costly, than many tons of return copper cables. An 80 lb. rail is equivalent to a 750,000 cm. and a double track of 4 rails is equal approximately to 3,000,000 cm. of return cable. If the joint resistance is made to four feet of rail, this means that a mile of double track is equal to a return cable of 3,000,000 cm. capacity a mile plus 10 per cent long. We use insulated copper return cables, of course, but we should need a great many more than we have were it not for a well bonded track. Good bonding is the best safeguard against electrolysis.

The type of bond used varies with conditions. Where there is paving we use the short flexible bond welded to the

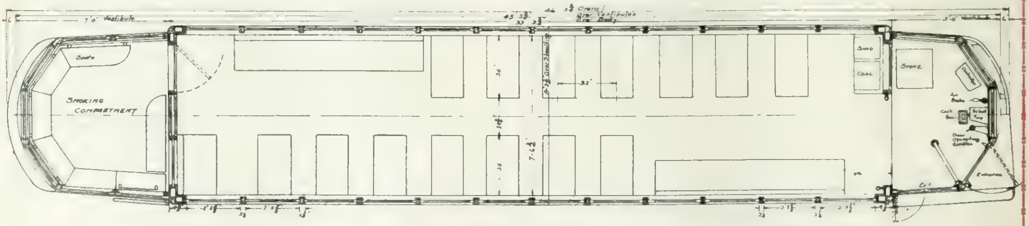


Fig. 2—Plan of Car used in Calgary

rail head, but wherever possible we use the long 4/0 Ohio Brass Co's. bond with the steel terminal and weld it to the base of the rail on each side of the fish plate. The latter type of bond does not interfere with work on the fish plate and is down out of the way where heavy truck wheels cannot rip it off.

At special track work the rails and manganese steel castings are all bonded together and reinforced by long leads which tie the ends of intersections together electrically.

Fig. 2 is a plan of the car used in Calgary, showing the seating arrangement, the location of the fare box, and door operating mechanism in the front vestibule. The rear vestibule is fitted up as a smoking compartment. The cars are heated with Peter Smith hot air heaters using coal. Last winter Cutler-Hammer electric space heaters were installed in the smoking compartments. With a low rate for electric power the question of heating the cars entirely by electricity with the thermostat method of control has been considered and it is the intention of the department to equip a few cars and try them out next year.

The following historical data will serve to show the cost, growth, and operating success of the department since its inception.

Construction and Equipment Costs to December 31, 1921

Organization	$ 4,525.51
Engineering Superintendence	6,213.25
Right of Way	4,876.00
Track R. Way Construction	1,580,475.15
Electric Line Construction	166,169,11
Real Estate used in Operation of Road	32,167.14
Building Fixtures used in Operation of Road	62,781.40
Investment Real Estate	782.00
Shop Tools & Machinery	5,806.61
Cars	418,617.09
Electric Equipment of Cars	160,053.95
Miscellaneous Equipment	13,574.79
Miscellaneous St. Openings	5,000.00
Losses on Sales of Debentures	84,922.12
	$ 2,565,967.12

Operation of Road Showing Passengers Carried Gross Revenue, Gross Expenses, Etc.

Year	Passengers Carried	Gross Revenue	Gross Expenses		Balance
1909	1,594,928	64,317.04	72,229.73	Dr.	7,912.69
1910	6,720,086	220,472.28	191,147.66		29,324.62
1911	10,578,130	380,239.35	342,451.53		37,787.82
1912	15,986,658	624,998.84	625,629.03	Dr.	630.19
1913	17,287,860	767,891.14	754,832.89		13,058.25
1914	16,308,279	702,530.26	698,698.66		3,831.60
1915	13,909,238	561,683.18	561,291.96		391.22
1916	14,519,256	605,634.18	576,912.09		28,722.09
1917	14,006,152	582,553.97	561,061.45		21,492.52
1918	14,871,290	637,579.66	644,697.90	Dr.	7,118.24
1919	16,918,251	834,413.40	792,180.45		42,232.95
1920	17,091,356	929,700.15	941,335.78	Dr.	11,635.63
1921	15,629,275	940,380.01	934,380.01		6,000.00
	175,420,759	7,852,393.46	7,696,849.14	Cr.	182,841.07
				Dr.	27,296.75
			Accumulated Surplus	$	155,544.32

Passsenger Cars with Motors	83
Scenic Cars	1
Baggage Cars	1
Trail Cars	6
Freight Cars	3
Auxiliary Cars	1
Sweepers	2
Derrick Motor Cars	1

Miles of Track

	Miles
1st Main Track	68
2nd Main Track	15
Total	83

Western Men Favor Standard Specifications

(Continued from page 80)

and therefore a higher priced article than the one which we are forced to ship further West in order to compete in price. This in several lines causes a duplication of stock. From the manufacturers' standpoint it means work and hardship to them as well as to ourselves.

"We do feel that some scheme whereby inspection and approval at one point could be established, would be a step forward, not only from the standpoint of the quality of merchandise marketed and the safety of the ultimate consumer, but for the convenience of the jobbers and manufacturers."

All Interests will be Best Served

"I understand that some organized bodies in Eastern Canada have considered the advisability of taking up in a serious way the question of creating an approval board for the electrical industry which would have Dominion wide powers.

"In my opinion this would be a step in the right direction inasmuch as such a board or body could eliminate some of the practices that are in effect today, due, I believe, largely to the lack of such a body, and which are certainly not economic.

"It seems to me that approval of appliances and apparatus can only be properly done (on the basis of economic service to the buying public) at the source of supply and not at the many hundreds of points of use.

"Generally speaking, our source of supply of electrical materials and equipment is geographically limited to a small area, while the points of ultimate use of such are only limited geographically by the boundaries of our country.

"Any plan then that is built on the idea of every civic center having its own electrical inspection bureau is, in my mind, wrong economically when those local or civic bureaus are allowed to each exercise its own judgment as to giving or withholding approval of material and equipment.

"Rather should such local or civic bureaus be limited to the work of inspection and checking to see that approved materials and equipment have been used under conditions that are safe and economic and to that extent only should such local bodies be legislative.

"To illustrate, we have certain items of equipment that carry the approval of the Board of Underwriters and of The Ontario Hydro Commission and yet which are not approved for use in Winnipeg proper. These same articles can, because they carry the approval of the two mentioned wide power bodies, be used in St. Boniface and other civic centers which adjoin Winnipeg. This results in duplicate stocks in both dealer and jobber stocks in Winnipeg.

"While volumes might be written on this subject, it seems to me that the case for an approval board having national powers can be summed up by saying "All interests will be best served when some properly constituted central body employing the most capable engineering talent having access to the best available testing facilities can exert a nation-wide influence by co-operating with all manufacturers and designers to the point of reducing the life and property hazard and simplifying and standardizing equipment and material for use by both the trained and lay public."

"Under such conditions the electrical industry can hope to some day take a place in the forefront of those businesses which have an economic reason for being."

Telephone Development in Saskatchewan

Eight times the number of rural customers and five times the number of long distance calls, represents progress of ten years

By W. WARREN
Manager Saskatchewan Government Telephones

Telephonically speaking, it may be said that the Province of Saskatchewan was undeveloped previous to 1908. In the early part of that year the Telephone Acts were passed, and in the month of June, the actual work of organizing the Provincial Telephone Department was commenced.

At this time the only systems in operation were owned by the Bell Telephone Company and the Saskatchewan company. The Bell plant consisted of a long distance system following the C. P. R. main line from the Manitoba boundary to Regina and Lumsden connecting up the towns along this route, and one or two other short sections of long distance leads, together with a few exchange systems. The Saskatchewan company operated a system from Regina and Moose Jaw, via Rouleau, Weyburn and Estevan to North Portal on the International Boundary, giving service to intermediate points. With the exception of a very few municipally and privately owned systems, the above may be said to be the total telephone development in the province by the middle of the year 1908, when the Provincial Telephone Department commenced functioning as an operating company, with a staff of twelve employees.

On May 1st, 1909, the Bell company's plant in the province was purchased, and on July 1st, the same year, the Saskatchewan company's system was taken over; a number of other smaller systems were gradually absorbed, the largest outstanding privately owned system, namely Saskatoon, being taken over early in 1912.

Doubled in Eighteen Months

By the end of 1909 or within approximately eighteen months of starting operating, the Department had more than doubled the long distance pole and wire mileage which previously existed in the province. At that date the system consisted of 20 exchanges, 100 toll offices, 1132 miles of poles and 1640 miles of metallic circuit.

Long distance, exchange and rural systems, were from this point gradually developed, but it may be said that the maximum development has occurred during the last decade, that is from 1911 on. At the beginning of the fiscal year, 1911, the total stations in operation were 9152, including 3590 rural subscribers. There were in operation at this time, 33 exchanges, 143 toll offices, and 1647 miles of l. d. pole lead, 2202 miles of metallic l. d. circuit, 142 rural companies were operating, the total distance of pole lead built by these companies being 3491 miles.

The population of the province at this time was 492,432, giving a rate of one phone to approximately 53.7 of the population. From this period on very rapid developments were made.

Exchanges

The rapid development of the larger centres necessitated the use of the most efficient and very latest type of equipment, with the result that when Saskatoon was purchased, steps were immediately taken to convert it from the three to the two wire system of automatic operation, and this exchange was opened for service under the new system in October, 1912. From this time on an average of one exchange has been converted annually to a more modern type of equipment.

In June, 1912, the common battery exchange system in Regina was destroyed by cyclone, and a temporary building had to be erected and emergency equipment installed. The opportunity was taken, in the circumstances, to erect a new exchange for housing automatic, and automatic service was cut in at this point on January 17th, 1914. During the early part of this year, the exchanges of Weyburn and Yorkton were cut over from magneto to common battery service. In the fall of 1914, a new exchange was erected in Prince Albert for housing of automatic equipment. On February 4th, 1915, this exchange was cut over from magneto to automatic service. During 1916 Estevan exchange was built and cut over from magneto to common battery service. In 1918 Swift Current exchange was converted from magneto to automatic, and in 1919 Moose Jaw was cut over from the common battery to automatic.

Community Automatic Exchange

During 1920 a community automatic exchange was put into commission at Qu'Appelle. This was the first of its type installed in Canada. A.P.A.X. equipment was installed in Regina and Saskatoon, and rural automatic service was instituted in Regina. During the past year North Battleford was cut over from magneto to automatic, and about one dozen new exchange buildings erected, capable of housing automatic equipment at any time that may be decided to install same.

The small exchange development has also kept pace, as is evidenced by the fact that at the present time there are 289 government owned exchange systems in the province. 579 cities, towns, villages and hamlets within Saskatchewan are on direct l. d. communication over the government l. d. systems, 289 being exchanges, 159 toll offices, and 103 having service over rural lines, and 28 are exchange systems either owned municipally or by independent companies.

Larger exchanges, where conditions warrant, are operated by the department, but the most of the smaller points are operated on a commission basis. In larger rural centres rural companies have in a great number of cases erected buildings for the housing of the central office equipment, and operate both the exchange and rural systems as commissioned agents for the department. This system has proved very satisfactory.

The urban population of the province in 1911 was 131,365 according to Dominion census figures, and estimating it as 196,390 at the present time, the phones per head in urban communities has increased from 1 per 23.6 in 1911 to 1 per 5.8 at the present day. Taking the five cities in this province having a population of over 5,000, viz. Regina, Saskatoon, Moose Jaw, Prince Albert and Yorkton, with a total population of 92,064, the phones are at the rate of 1 per 5.5, of population, which is conclusive proof of the fact that urban development is not confined to the larger centres only, but is most uniformly distributed over all urban communities. The above condition, as far as available statistics are concerned shows a most unusual condition of development for

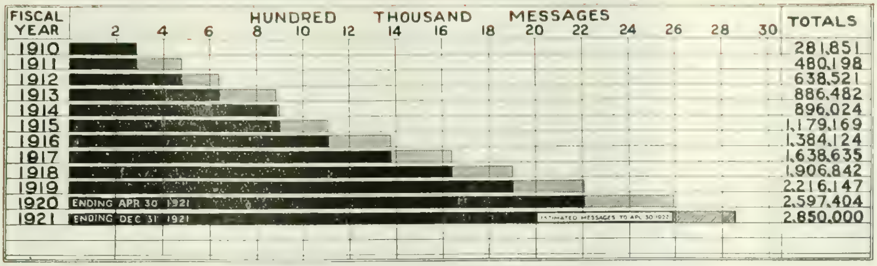


Chart showing yearly increase and totals of long distance messages, Saskatchewan

a large operating company, as the normal development in larger centres is usually out of all proportion to the smaller community centres taken on a total population basis over a large area.

Long Distance

The long distance development has also been very rapid, and at the present time there are 5,842 miles of pole lead and 15,552 miles of metallic circuit. This is mainly composed of No. 10 N. B. S. copper, No. 12 N. B. S. and No. 8 B. W. G. There is a very small proportion of 9 and 12 B.W.G. iron circuit still in use, but this represents considerably less than one per cent of the total circuit in the province.

In the early part of 1921, a new feature in automatic dialling was adopted, namely a two way automatic dialling service between Moose Jaw, Regina and Saskatoon. This was not the first dialling circuit installed in the province, as one way dialling had been in operation early in 1914, but no attempt to put in a two way dialling system previous to date mentioned above had been made.

Rural Systems

Previous to 1913 the development of the rural system throughout the province was not very rapid. In this year a new rural telephone act was passed incorporating rural telephone companies, the special features of this Act are, that all companies incorporated under this Act are governed by the provisions of the Rural Telephone Act and the Company Act, and are subject to the Regulations of the Department of Telephones. They have the option of selecting their own telephone area and point of exchange connection. The majority of the resident land-owners within the area selected must agree to have telephones, and a list must be submitted of all those not requiring them. The Rural Branch of the Department then draws up plans, to be built according to the Department's standard specifications, and if all the provisions of the Act are complied with, sanction the organization of the company. The company is then in a position to call for tenders for construction, and all tenders received must be submitted to the Department, where, if the amounts are reasonable, same are approved, with a recommendation to the local government board who have the power to veto or sanction the borrowing of the monies required. Rural telephone bonds are considered very good security, in that they are redeemable in fifteen years or less, and are guaranteed as a tax against all quarter sections passed by pole lead. The necessary legislation has been passed to enable the municipalities to collect these taxes in the same way as general taxes levied against the land.

In the case of leads paralleling for short sections the first lead built has the right to taxes, unless the second company is installing the phone on any quarter section passed, when the taxes on that quarter section only are transferred to the new company. Provisions are also made for the rendering of annual reports and for auditing.

Rapid Rural Development

Under the above Act the rural development within this province has been most rapid. It is safe to say that in no other territory under any other system have such marked developments been made in this class of service. At the present time there are 1172 rural companies operating, with 53,702 miles of poles and 87,265 miles of metallic circuit and 60,020 telephones. The total capitalization of the rural companies within the province is roughly fourteen and three quarter million dollars, the approximate acreage served being twenty-two and one half million. The approximate number of quarter sections taxed under this Act are one hundred and forty thousand, the average tax levied being fifteen dollars and seventy cents per quarter section where a phone is installed, and ten dollars and thirty-five cents where

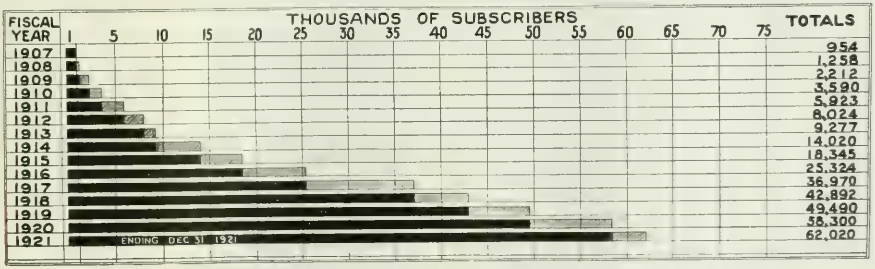
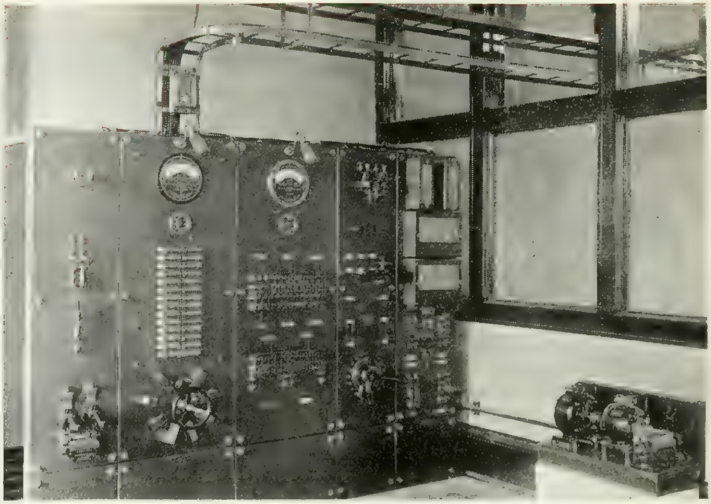
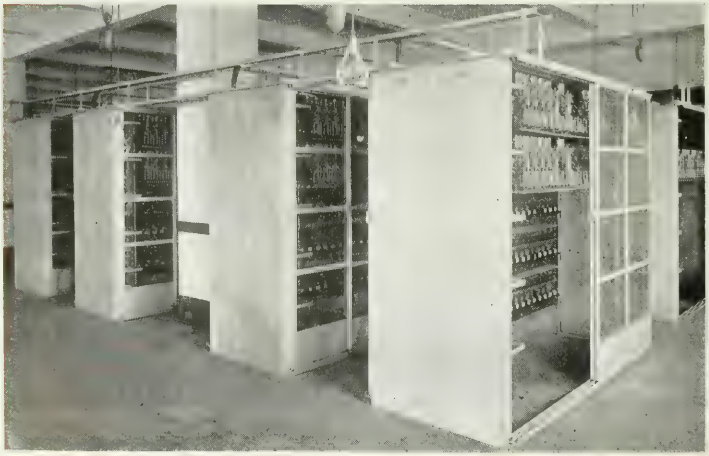


Chart showing yearly increase and totals of rural telephones in Saskatchewan

Typical Exterior and Interior Views of Saskatchewan's Telephone System





Above—Saskatoon Exchange, showing power plant.

Left Centre—Prince Albert Exchange Building.

Right Centre—Moose Jaw Exchange Building.

Left Below—Regina Exchange, showing Selector Bays.

phones are not installed. The average rental charged by rural companies to their subscribers for maintenance and operation is fifteen dollars.

In the winter of 1916-17 a school was started giving short three week courses to enable candidates selected by the rural companies to obtain as much information as possible on elementary methods of maintenance, and to date 465 men have passed through this school.

Taking the present developed area, as from the International boundary to Township 54, an area of roughly 118,600 square miles, the present rural development not counting urban telephones shows a development of one phone for every 1.9 square miles of territory. If, however, forest and Crown lands, Indian Reserves, area covered by lakes and other unproductive lands within this area is not counted, the development shown would be approximately one phone per square mile of territory.

The rural population of Saskatchewan is given in the Dominion Census figures for 1911 as 361,067 and estimating the figures for this year as approximately 565,000, we find that in 1911 the rural development was one phone per 100.5, whereas, to-day it is one phone per 9.1. Considering the fact that they each have an outlet, via long distance to practically every town and village situated over a populated area of 1,000,000 square miles, we think it is safe to say that the development, as far as rural communications are concerned, in the province, are absolutely unique.

Operation

On account of the province being almost entirely dependent on agricultural pursuits, small communities have sprung up at intervals of from eight to ten miles, creating rather unusual conditions as far as long distance messages are concerned, in that, the proportion of very short haul calls form a much greater proportion of the long distance business carried, than in most operating companies, there being a proportionate decrease in the long haul business handled. The conditions governing the service being somewhat different from other companies of approximately the same size, independent methods of handling the business, have been, to a very large extent, developed. The natural developments along these new lines have resulted in a reduction in operating expense from year to year, together with an increase in the efficiency of the service given.

Special cordless circuits have been installed to speed up the operating, and over 10 percent of the l. d. lines are operated as one or two way dial lines, circuits have been arranged so that two or more stations can dial in on the same line, all the features of manual operating being retained, and the transmission equivalent of the lines not being increased beyond the cord circuit equivalent which has been eliminated.

An additional circuit has been developed for automatic switching of lines at existing switching stations to reduce work to a minimum. With these methods, it has been found that an increase in efficiency generally has been obtained compared with the old operating methods, as distant exchanges immediately become a multiple office organization with respect to the automatic centre.

Due to the very rapid developments made in wireless communication in the last few months, a special study is being made of this important branch of communication work with a view to augmenting existing means of communication by applying the most recent engineering developments where same can be used advantageously for the betterment of the existing service.

The number of employees has increased from the original twelve to approximately six hundred and fifty, and the installation of telephones to ninety-five thousand six hundred and sixty-four, composed at December 31st, 1921, of 17,137 automatic, 1,667 common battery, and 12,940 magneto phones owned and operated by the government. 62,020 rural phones connected to government exchanges or telephone systems. 930 phones installed in 103 villages by rural companies, and connected to the government long distance system. 970 additional phones connected to points at present not reached by the Department's l. d. service. The census figures just available give the population of the province as 761,390, which on the above figures shows one phone per eight of the rural and urban population. During the last decade the phones per rural population have increased from one phone per 100.5 of the population to one per 9.1 and for the urban centres from one per 23.6 to one per 5.8 of the urban population. Taking this rural and urban development into consideration, Saskatchewan as a unit of comparison with the development of the telephone industry in other countries will be found to compare very favourably with any other country.

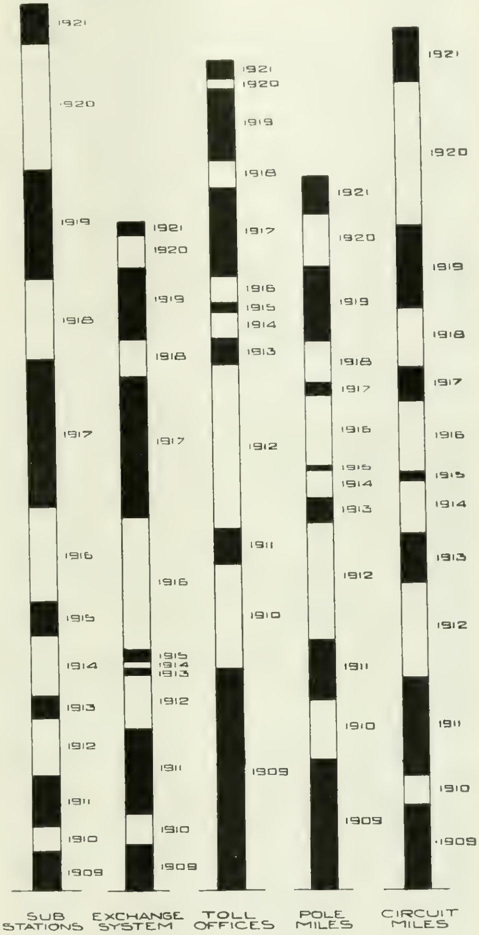


Chart showing yearly development of government system

Alberta's Policy of Rapid Extension

Has Spent Over Twenty Millions on Her Telephone System — Fifty Thousand Subscribers and 37,000 Miles of Lines

By R. B. BAXTER, General Superintendent.

If the statement seems paradoxical nevertheless it is fact that Alberta's great telephone development was foreshadowed many years before the geographical division of the North West Territories of Canada, forming the present province of Alberta, was made.

Only eight years after Graham Bell's historic triumph in transmitting human speech over a wire, citizens of Western Canada were experimenting with the new electrical wonder.

Alexander Taylor, agent for the Dominion Government Telegraphs, brought two telephones from England in 1884. One he established in the Factor's office of the Hudson's Bay Company trading post and the other in his own office in the village of Edmonton, half a mile away. The experiment, it is reported, met with indifferent success but it served to awaken intense interest in the new means of communication and early in the following year two more telephones were ordered by Dr. H. G. Wilson and Judge Rouleau.

Railways had not yet reached the Far West and delivery by ox cart was slow. Interest in the telephone was keen and speculation rife among the pioneers as to the possibilities of communication by telephone over any considerable distance. Mr. Taylor was a strong advocate of long distance telephony and to prove the possibility arranged an experiment.

Richardson, the Dominion Government telegraph agent at Battleford, in what is now the province of Saskatchewan was instructed to stop the ox-cart train, get one of the two telephones being freighted across the prairie and connect it up at his end of the telegraph line.

The operators at the various offices between Edmonton and Battleford were then instructed to cut out their batteries at midnight on a given date. All complied except one who went hunting and forgot.

On delivery of the other telephone in Edmonton, Taylor set up the connection and at midnight of the appointed day the test was made.

Both Taylor and Richardson tried to signal each other but the generators were too weak and so their repeated efforts ended in failure. Failing to signal by use of the generator they next proceeded to shout "Hello" into the transmitters and at last each heard the other. Fragmentary conversation was carried on for ten or fifteen minutes, long enough to vindicate the faith of Alexander Taylor and demonstrate the possibility of telephoning over long distances.

Two years later, in 1886, the Dominion Government telegraph service established the first long distance telephone line by converting the telegraph line between MacLeod and Lethbridge, giving fair service for a long time.

First Exchange in 1886

The first exchange was installed during the same year in the home of Alexander Taylor at Edmonton and had four subscribers. Growth was very slow for in 1894 the four had grown only to fourteen.

1887 saw the advent of the Bell Telephone Company of Canada. They had been pressed for some months by the citizens of Calgary, then the distribution center of what is now Alberta, and finally established an exchange of forty subscribers in that city in the fall of that year. At first the exchange was a failure due to lack of competent help but gradually improved and with the growth of the frontier town and repeated changes to more modern equipment the city of Calgary has the largest and most up-to-date exchange in the province.

Long Distance in 1891

The first telephone line built expressly for long distance purposes was erected in 1891 by the Mormon community between Lethbridge and Cardston. The scheme was engineered by the resident head of the Mormon Church, Bishop Card whose name is perpetuated in Cardston, the headquarters of the Mormon people in Alberta. In the same year Lethbridge received exchange service by the installation of an office with some seventy-five subscribers.

By this time the telephone had passed into almost common use and exchanges and long distance lines were being installed and erected all over the country.

Mr. R. B. Baxter

It is of passing interest to note that a vanished concern, known as the Alberta Telephone Company, gave long distance service between Blairmore, Coleman and Frank in the Crow's Nest Pass, without the erection of poles. The line was strung on growing trees and while breaks were frequent the service seems to have been maintained to the satisfaction of the users.

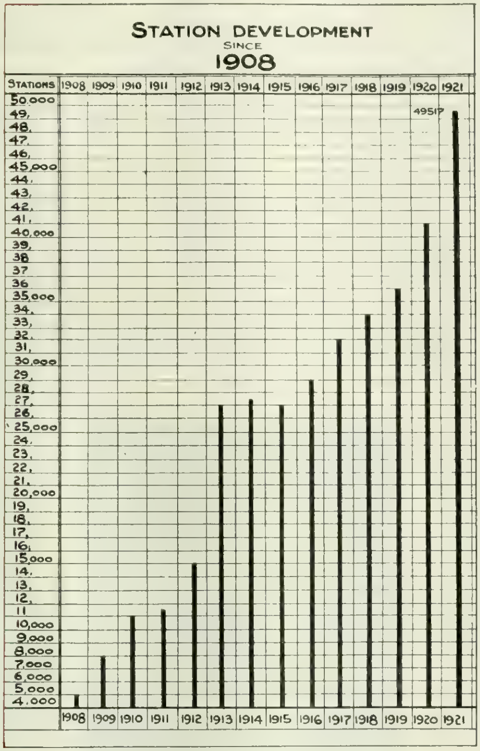
In 1905 the Province of Alberta came into being with all the rights and privileges of provincial autonomy. Immigrants were flocking into the new land of promise and spreading settlement farther and farther afield.

Pressure, growing more and more insistent, had been brought to bear on the new provincial legislature and effected the desired result in 1906 when it was decided to enter the telephone field by the erection of lines and exchanges with public funds.

Government Ownership

The first line was built in the fall of 1906 and cut into service in April 1907 between Calgary and Banff. It is claimed that this is the first government owned long distance line in America.

Under the stimulus of this new competition the Bell Company became active and the network of lines began to spread rapidly.


STATION DEVELOPMENT SINCE 1908

In the summer of 1907 negotiations commenced between the government and the Bell Company which resulted in the purchase by the government in April 1908 of the entire Bell interests in the province.

The telephone system was operated by the Department of Public Works until 1912 and while growth was steady the phenomenal expansion of the system may be said to have really commenced in that year with the creation of the Department of Railways and Telephones.

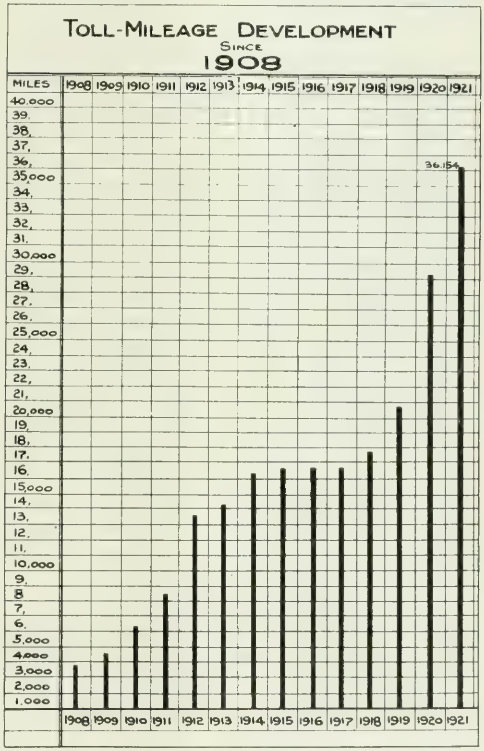
The policy of the government has been from the first to extend the utility to the rural community as rapidly as possible, at the same time making due provision for the fast growing towns and cities and the necessary channels of communication between them.

The policy of rapid extension of the rural system has done much to aid the development and settlement of the country. Every farm home with a telephone is connected by long distance lines over the length and breadth of the province. Almost twenty thousand miles of standard line are in active use for rural purposes giving first-class service, almost impossible under private ownership, but an essential factor in the public welfare and development of a young and rapidly growing country.

Monopoly has been aimed at with the result that with the exception of the local system owned and operated by the city of Edmonton, the Dominion Park System, owned by the Federal government at Banff and two or three isolated farmer lines, the entire telephone system of the province is publicly owned.

Nearly twenty thousand farms and over thirty thousand homes and business places in the towns and cities are connected by telephone and the long distance lines are second to none in the Dominion. They cover a territory six hundred and fifty miles long from the International Boundary to Calling Lake, twenty miles north of Athabasca and three hundred miles wide from the Saskatchewan boundary to the mountains. In addition there is a small section at Grande Prairie and Peace River not yet connected with the main system.

Alberta is the possessor of the first carrier current system in Canada and the fifth in the world. It was installed in the summer of 1921 with two channels between Calgary and Edmonton and is giving excellent service.


TOLL-MILEAGE DEVELOPMENT SINCE 1908

The automatic telephone is used exclusively in the three larger cities, Calgary, Lethbridge and Medicine Hat, while common battery is installed in the bigger towns and magneto offices in the smaller.

Manitoba Has Fine Telephone Service

One Telephone to Every Nine of Population — Automatic Service Finds Favor in Larger Centres

By J. E. LOWRY, Commissioner of Telephones.

Telephone service in Manitoba dates back to the year 1882 at which time exchanges were established at Winnipeg, Brandon and Portage la Prairie. The system at that time and until the year 1908 was owned and operated by the Bell Telephone Company of Canada. In 1907 the Manitoba Government entered into negotiations with the Bell Telephone Company and in January 1908 took over the entire Manitoba system. At this time, there were 8,792 telephones in use in Winnipeg and 5,219 telephones in use throughout the balance of the province.

Under government ownership, telephone service in Manitoba has progressed, expanded and developed to its present high state of economical efficiency, adopting in the course of its growth practically every means of increasing the transmission of commercial and social intercourse. Its facilities have been extended to the smallest and remotest towns in the province, not with regard to cost or with an idea of profit, but for the sole purpose of serving the people irrespective of their wealth or position.

To attempt to estimate the value of the telephone service to the citizens of Manitoba in dollars and cents, would be a stupendous undertaking for with the countless benefits which the people of the town and country are enjoying because of the widespread development of local, rural and long distance service are added, an estimate of its intrinsic worth to the country at large, is a sheer impossibility. If one class of people has benefitted more than another, it is the farmer. Instead of the dreary isolation which in former times they sometimes had to endure, they are now linked together in a vast neighborhood by the wires of the Manitoba Telephone System, and when they desire to communicate with friends at a distance it is unnecessary to make a long uncomfortable trip; they are also able to keep in constant touch with their work and during harvest and threshing when repairs are needed in a hurry they find the telephone a most useful servant—and best of all, the service is very reasonable. Considered from every point of view the telephone is the farmer's best investment and fortunate for him was the day when the Manitoba government assumed control of the telephone business in the province and developed the system, which in a few short years has provided service in nearly all parts of the province.

Developed on a Large Scale

The development of the telephone system in Manitoba during the past few years has been on a large scale and at the present time the service extends to practically all the settled towns in the province, and in the rapid development which has taken place, every precaution has been taken to use only the best material and up-to-date construction methods, with the result that to-day the people of Manitoba have a telephone system second to none. The lines and equipment of the system are built standard in every particular and it is the aim of the management to keep it at a high state of efficiency by the employment of the best available skilled labor.

Manitoba, with a population of 613,008 people has 68,000 telephones in use and of these, 64,752 are direct subscribers to the government system, the balance being connected with municipal systems and private companies—these private systems, however, have direct connection with the government long distance lines and therefore enjoy, with the government subscribers, all the benefits which accompany connection with the provincial system.

The growth of the system has been continuous, considered as a whole. The following will show the number of telephones in use at the various periods during the past 14 years:

		Winnipeg	Provincial
January	1908	8,823	5,219
December	1909	12,758	8,654
December	1913	26,089	19,650
December	1918	29,263	23,044
December	1921	38,811	25,942

To accomodate the large number of subscribers, there is a total of 116 exchanges throughout the province.

In addition to the Manitoba government having provided the people with a first-class telephone service at reasonable rates, large sums of money have been spent to provide a long distance telephone service as the following will show:

Mr. J. E. Lowry

Net work of long distance lines of the system comprises 2,556 miles of pole line and 20,366 miles of wire.

Automatic Telephone Service

In the building up of a modern telephone system, advantage must be taken of improved methods of operation and the use of advanced ideas. The Manitoba Telephone System has not lost sight of this fact, and the time having arrived when additional switchboard facilities were required to take care of the continuous growth of the city of Winnipeg, a central automatic exchange was installed to serve the subscribers of the business section of the city. Automatic exchanges were also installed to serve the subscribers of St. Boniface and Norwood. In the Winnipeg portion the present equipment capacity is 11,900 lines. The Norwood exchange present equipment has capacity of 1,700 lines.

Additional equipment is being added from time to time to take care of the increase in applications for telephone service. Plans have been made to change the service of two more manual exchanges at Winnipeg for automatic service and it is expected that the change will be completed early in the year 1923.

The city of Brandon is a full automatic service, including rural lines numbering some 480 rural subscribers.

The Manitoba Government has provided a modern telephone service to the people of the province. It is the people's own telephone system and a credit to the province as a whole.

Edmonton Also Has Automatic System

This Progressive City Has Invested Two and a Quarter Million Dollars and Shows a Substantial Profit Every Year

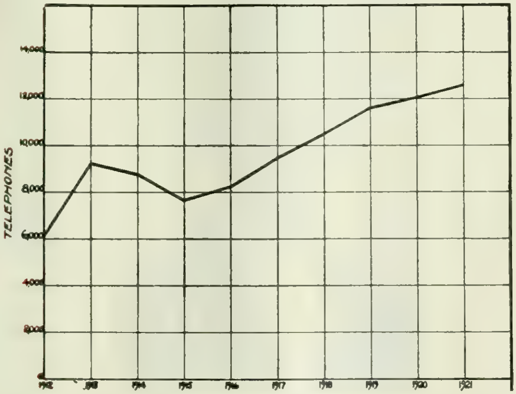
By R. CHRISTIE, Superintendent.

The Edmonton Telephone System is a municipal enterprise owned and operated by the corporation of the city of Edmonton.

The original plant was of the local battery magneto type switchboard operated by a private company until purchased by the city corporation in the year 1905 when there were about 600 subscribers' lines in service.

The citizens were rightly of the opinion that this magneto type of equipment was obsolete and would very soon become inadequate owing to increasing population so they began investigating the various types of modern telephone apparatus with the view to installing an up-to-date telephone exchange.

After visiting several cities in eastern Canada and the United States the representatives of the city looked into the possibilities of machine switching telephone equipment and were convinced that automatic telephony was to be the system of the future.



Edmonton Municipal Telephone System—Telephones in service 1912-1921

Having investigated all types of automatic equipment, it was decided to install the Strowger system manufactured by the Automatic Electric Co., of Chicago, who completed the installation of a 1,000 line switchboard in August 1908, when subscribers' lines were cut over from the old magneto switchboard to the automatic.

Owing to the popularity of the automatic it very soon became necessary to increase the capacity of the switchboard so that in 1910 there were 2,000 lines in operation.

During the next four years the system was rapidly being enlarged because of the greatly increasing population and the subsequent development of the city. In 1913 two new exchanges were put into service and the Strathcona exchange became a part of the Edmonton system, when amalgamation of the two cities took place.

During the war period the telephone situation remained stationary and very little construction work was done until the year 1919, when the demand for service became so great that it was found necessary to erect a new Main Exchange building and install another 1,000 line addition of the latest 2-wire type.. This addition was cut into service in August 1921 and owing to the numerous connections of new subscribers plans are being prepared for further additions to three exchanges during the present year.

Beginning in 1905 with less than 500 telephones, the Edmonton municipal system to-day has 11,700 lines with 12,900 telephones in service, which with an estimated population of 62,000 people, averages one phone for 4.8 of the inhabitants or 100 phones for every 480 persons.

The traffic handled by the equipment amounts to 182,000 calls each working day or an average of 15.7 calls per line per day.

The outside plant consists mainly of aerial and underground cable construction varying in size from 50 pairs to 800 pairs, making a total cable mileage of 161 miles with a total single wire mileage of 62,024 miles.

The total capital investment to-day is two and a quarter million dollars. The service rates; domestic $30.00 per year and commercial $55.00 per year, are equal to, or even better than any city of equal population on the American continent. The system being a municipally owned utility has shown a substantial profit for several years. In 1920 this surplus amounted to $60,000.00., 1921, $78,000.00 and every indication goes to show that 1922 will be an even better year than any previous one.

Ask the Editor

Do you, Mr. Subscriber, write the Editor of the "Electrical News" when you want information? If not, you are missing service to which you are entitled.

Always delighted to assist our readers.

Merchandising Problems and How They are Being Solved

A Discussion of Many Topics. Exchange of Viewpoints Generally Leads to Solutions. The West is a Vast Field for Appliance Sales. Central Stations, for the most part, Co-operate, but do not Compete with the Electrical Merchants

The Central Station a Factor in Selling Appliances

By JIM. SWAN

If the central station did not exist there could be no place for the electrical manufacturer, jobber or contractor-dealer. These three classes are entirely dependent upon the central station for their existence. All development in the electrical industry has been built around the activity begun by the central station.

The central station is the pivot upon which every merchandising wheel of the electrical industry turns. All development carried on by the central station is bound to assist, very materially, manufacturer, jobber and dealer alike.

In any community with a large population and where the cost of current for domestic purposes is but a fraction of the cost of other fuels, then the demand for appliances for the use of that cheap power will continue to grow as the people become educated to its use.

Up till the present time the merchandising of electrical appliances has been left almost entirely to the central station, more especially with regard to the merchandising of the electric range. The reason for this is, that most central stations look upon the electric range as the supreme load builder. It was therefore necessary for the central station to assume the responsibility of getting it in large numbers into the homes of the people and then keeping them 100 per cent. satisfied with real service. There is nothing that will cause dissatisfaction more quickly than poor service. Fundamentally, the idea is to keep a customer satisfied — with service.

Financing Difficulties

Most contractor-dealers on account of their inability to invest money in a stock of ranges or to finance time payments have been placed at a considerable disadvantage and therefore the central station was left with no other alternative than to get into the merchandising field for the safety of their own business and the unquestioned benefit to the public.

Central station development has been aptly termed the thermometer that indicates the degree of prosperity of the entire electrical industry. Can we in our mind's eye picture what Canada would be like to-day if we were to take from it the electrical industry? To a very great extent it is true that the progress of civilization is measured by the progress of electrical development. Transportation, home comforts, efficiency of production and the great possibilities of the future all have their springs deep-rooted on the solid foundation so well and truly laid by the central station.

There is a large undeveloped field in this western country. There remaineth yet much land to be possessed, and if agriculture is to be extended, factories built and homes electrified, it can only be done by real effort, coupled with enthusiasm and determination, together with a spirit of co-operation between central station and contractor dealer.

Low Rates and Abundant Energy

The very low rates which have been established in many communities and the abundant surplus of energy that is now available in many of these communities should be the means of getting every electrical man into line and going forward to success.

The selling lines of electrical appliances have broadened remarkably within recent years so that it is now possible to place within any store an all electrical display that can easily equal and outclass many of the finest displays shown by the leading shops in other lines. The electrical trade, however, has not as yet realized that fact and many of them are content to carry on in dismal surroundings of their own making, while they deprecate the fact that business is not coming their way. It is in this respect that the central station is once more an important factor, making an honest endeavour to place the electrical industry in the fore-front and raising a standard that will be the means of wholesomely stimulating the electrical trade.

Mr. J. Swan, manager Winnipeg Hydro Appliance Department

One of the duties of a central station is to help the contractor-dealers make money. Some central stations are doing this in a real way, speeding up sales by consistently keeping the public thinking electrically by a sustained advertising effort which is an important factor in successful merchandising.

Helping Contractor-Dealer

Another way the central station is helping the contractor-dealer to make money is by giving him the installation work on the range and water-heater sales effected by the central station. If the contractor-dealer is doing a real job then it is without question the duty of the central station to turn all that work over to him. During 1920 the Winnipeg Hydro-electric System gave approximately $30,000 worth of wiring and installation work to the contractor-dealers.

The same methods are practiced in other cities and are helping to keep the spirit of co-operation alive between central station and dealer.

It is not good policy for a central station to sell electrical appliances at less than manufacturers list, for if this is done it is sure to undermine any good fellowship or cooperation that may exist between the two. Every electrical appliance sold by the dealer counts on the credit side of the central station ledger and means continued revenue for the central station, whereas the dealer's profit is obtained by selling above cost and he is entitled to a legitimate margin from the sale of all appliances.

Immense Possibilities

The possibilities looming up before us are immense. Canada is electrically unsaturated. If the City of Winnipeg is any criterion the scope is unlimited as there are only 10 per cent. of the people enjoying the great pleasure of eating food that has been cooked electrically, while only 2 per cent. are taking advantage of the cheapest and most efficient method of heating water. At the very low rate now obtainable in most cities for domestic purposes, the aim of every central station and dealer should be the installation of an electric range and water heater in every home.

Another field that might be exploited is the washing machine field. If it is true that only one washing machine is placed on the market for every eight automobiles it is high time we were up and doing as there is no greater necessity in a home than a good clothes washer. Facts like the above should compel us to do a little human stocktaking so that we might discover just where the fault is, and what is the reason for the belated condition of the electrical industry. Surely the range, water-heater and washing machine are as necessary in the modern home, as are the typewriter and flat top desk in the modern office.

Moloney's New District Manager

The Moloney Electric Company of Canada, Limited, beg to announce that Mr. Frank H. Girdlestone, manufacturers' agent of Winnipeg has discontinued his agency business and has accepted a position as Moloney district manager, making his headquarters in their new offices, 27 May St., Winnipeg. Mr. Girdlestone will look after the Provinces of Manitoba and Saskatchewan. Transformer shipments for these Provinces will be made from the company's Winnipeg warehouse.

Why the Central Station Should not be a Factor in Selling Appliances in the West

By L. B. DICKSON, Vice-President McDonald & Willson Lighting Co. Ltd., Winnipeg

Municipally owned central stations should not enter into competition with the citizens of the municipality in which the utility is situated in any other business than that for which the utility was specifically created. It is to be assumed that the business for which a civic hydro plant is created is the purveying of power at as near cost as possible to the citizens whose money is invested in the concern.

To go further than the purveying of power to the citizens is to invade a field which was not included within the powers granted to the plant when the citizens brought it into being. To enter into the merchandising field in electric appliances is an invasion of private business fields no more legitimate than if the municipality were to enter upon the business of supplying boots and shoes, gramophones, or ready made clothing to its citizens.

Were a municipality to propose to provide its citizens with clothing, or any other object of merchandise usually sold in stores, there would be an instant upheaval of sentiment that would quickly put the offending administration out of business. The cry would instantly be raised that the municipality was using the citizens' own credit and their own taxes to diminish or destroy the citizens' business which is the source of taxation.

Citizens of Winnipeg voted on the money bylaw to build a power plant for the purpose only of supplying its citizens with electrical energy with the understanding that this energy would be supplied at one third the rate being charged at that time. It was not the understanding of the tax payers that the City Hydro would enter the merchandising field, nor does their present charter give them that privilege. At the time the charter was granted, there were very few appliances for domestic use on the market, such as the electric range, which is about the only appliance used in the home that is any considerable factor in creating a load for the central station.

At the present time there are in western cities electrical contractor-dealers with attractively equipped show rooms for the display and demonstration of electric ranges and washing machines, vacuum cleaners, and all other electrical devices used in the home, installed at very considerable expense to themselves; and the contractor-dealer feels that as a citizen and tax-payer, paying rent and business tax and all the other levies from which the municipality directly or indirectly derives its revenues, and which the municipally owned plant with its appliance department is not called upon to pay, he is working under a very great disadvantage. Apart entirely from the unethical proposition of using his own money to take business away from him, he feels that owing to the features of the situation above mentioned he has to meet a very unfair competition.

The management of the Winnipeg central station has on various occasions expressed its willingness to co-operate with the contractor-dealer. If it wishes to carry out this declared intention, it should adopt the principle now existing in Edmonton, for instance, where the city plant maintains a showroom for displaying electrical apparatus supplied by the various dealers in the city, and referring their prospects to the dealers, so that the sales may go through the proper channel.

The statement is reported to have been made by the manager of a central station that the civic enterprise did not have to pay any dividends. That is the case; and it is another example of the unfair competition to which the contractor-dealer is exposed. How long would it be possible for a contractor-dealer to continue in business if he were to do business for nothing?

In the Hydro News Bulletin of February, 1922, the Hydro makes the following statement: "We objected to and will continue to oppose all profiteering schemes."

In that statement the contractor-dealers feel that there is a distinct slur on themselves, whether intentional or otherwise, and that such statements are anything but clean competition; even supposing the civic owned plant had the right to compete at all. To-day there are only two dealers in Winnipeg who were in the business fourteen years ago. Numbers of dealers have started up in Winnipeg in recent years, but very few have been able to remain in the business. Such a condition does not look like profiteering.

In conclusion, it might be noted that the Winnipeg Hydro is the only municipal central station in the three prairie provinces at the present time selling electrical appliances in competition with its own ratepayers.

Selling the Electrical Industry to the Public in the Prairie Provinces

By L. M. COCHRANE President of Cochrane, Stephenson & Co. Ltd., Winnipeg

A few years ago the public of Western Canada had not much more than a passing interest in the electrical industry, and those working in the industry itself devoted their best efforts toward the sale of strictly supply and appliance and maintenance material. Electrical merchandising as it is today was thought a possibility of the future, but little attention or time was given to selling the industry to the public. Progress in the development of things electrical has been rapid. So much so, that we have been forced to realize we are faced with a problem which must be solved by the electrical industry and no other. Our problem can be termed "Selling the Electrical Industry to the Public." It cannot be stated that progress toward this goal has not been made, and results to date have amply proven the public to be receptive, and only waiting for the industry to take advantage of its opportunity.

To get our sales message to the public is our big problem, and it is really a community service that has got to be performed by the co-operative effort of the manufacturer, jobber, contractor-dealer and central station. Our great need today is to get the interest of the consumer as greatly centred in things electrical as in home furnishings, talking machines and automobiles. There are thousands of people who go shopping every day in the week, or to put the matter another way, who go sight-seeing in the stores. As compared with other lines of business the retail electrical store gets but a very small percentage of these shoppers. They do not deliberately pass up the electrical shop—instead, they have not been sold to the idea of shopping or sight-seeing in electrical stores.

Public Doesn't Know

Something new in the electrical industry is developed and put on the market, yet oftentimes it is months, and in some cases much longer, before the consuming public are generally familiar with it. If you do not believe this, start quizzing some of your friends outside of the industry on this point, and see how well posted they are on things electrical.

For instance, how many people do you know who have a fractional horsepower motor (better name, a kitchen motor) for polishing, buffing, grinding and a dozen and one other odd jobs it will do? Ask them if they own one, and will find the majority never heard of it before, and will no doubt tell you they thought motors were used only in machine shops, or manufacturing plants.

The public will not seek us and ask to be told the wonders of the electrical industry. Instead, we must seek them. In every city of Western Canada there are clubs and organizations to whom we have a story to tell, but we are not making speed records in getting to them with our propaganda.

As an example: There are several well-organized community clubs in the city of Winnipeg that meet at frequent periods, always in the evening. It is commonly known that one of their problems is to get timely and interesting subjects. Is there an opportunity here for the electrical industry? Thousands of new buildings are going to be erected in Western Canada in the next few years, and it is to the owners of these new buildings the electrical merchants have a message to tell. These prospective owners have got to be sold to the electrical industry before they build if things electrical are to play the part they should in these new structures. The industry has important sales work to do with architects, associations, home owners, clubs, realty men, building contractors' associations and many other similar organizations.

Mr. L. M Cochrane

Special Propaganda Required

It is by working publicly with these bodies that real progress can be made, and the masses reached. To accomplish this, the right kind of publicity and propaganda has got to be planned. The manufacturer, jobber, dealer and central station must never lose sight of the fact that they are setting out to sell the consumer, and thus plan their advertising so that it will appeal to the layman. A large percentage of the so-called consumer advertising as gotten out to day goes into the inventory bonfire of the jobber, and the dealer.

The dealers, central stations and jobbers can get along with a limited supply of bulletins, catalogues, pamphlets, etc., written in the usual terms of the industry and for use among the trade, but a new standard has got to be set in consumer advertising, and more of it supplied.

It is our business to create the desire of the consumer for things electrical, and to make this task as easy as possible. We will never do it by sending out consumer advertising loaded to the gunwales with "volts, amps, watts" and other terms that are Greek to the average buyer. In short, where is there anything creative in this kind of advertising? Let us feature the convenience, comfort and service of the article, and so create the desire to own it. Many electrical appliances are being featured in this manner—thousands are not.

Propaganda of an educational nature to interest the layman, and for use with clubs and associations, has got to be available. In the United States great progress has been made in this direction, and no doubt a large part of their propaganda is available for our purpose. The industry in Canada, however, should be capable of developing our requirements, and it is primarily up to the manufacturer and the jobber to take the lead in developing the kind of publicity that will appeal to the consumer.

In Western Canada, Winnipeg and Vancouver are the only two cities in which an effort of any kind has been made to sell the electrical industry to the public, and even in these two cities the surface has not yet been scratched.

A Western Canada Electrical Association, composed of every branch of the industry, namely jobber, dealer, and central station, and supported by the co-operation of the manufacturer, is a vital necessity. Such an organization should have as its goal nothing short of seeing that every worth-while central station district in the West has its electrical club or publicity committee (large or small) busy selling the electrical industry to the public.

When the industry starts co-operating as a unit, and sees fit to take advantage of the opportunities that surround us, then will the retail electrical shop start to get its share of the shoppers who are now passing by.

Selling Equipment and Appliances in the West—A Different Proposition

By FRED. E. GARRETT
Sales Manager Great West Electric Co.

A jobber's salesman covering Western territory has a much different proposition from a salesman in the East for the reason that a salesman in Ontario, for instance, is never very far from his home office, whereas the salesman in the West has sometimes hundreds of miles between customers and is at all times at least a night's run from his home. Then again the salesman travelling in Saskatchewan wanting to get in touch with his firm in Winnipeg by telephone has to be careful how long he talks and how often or his telephone bill soon runs away with the profits of the order he may be conversing about.

Hotel and railway accommodation is another matter that gives the salesman in the West great concern as it is an important part of his life. He spends the most of his time, when not seling goods, on the train or in an hotel. Travelling accommodation on the main lines of the transcontinental railways is the best to be had but in the branch lines is not so good. I remember one time travelling on a mixed train and it averaged five miles per hour, including stops, for a distance of forty miles—fortunately for me this branch line was no longer, because on the prairies you do not find restaurants planted very thick. Salesmen selling electrical lines are perhaps more fortunate than those carrying such lines as groceries and dry goods, because our electrical man does not have to touch the small towns his brother salesman has to and he, therefore, lives at the better hotels. The poor devil calling on small towns of about a dozen buildings quite often finds hotel conditions much like I experienced some years ago. I stayed over night in a boarding house, which the natives called an hotel. The manager reported a full house, meaning that his rooms were all occupied, and believe me they were; about 2 a.m. I moved out into the livery barn and finished the night with the horses. Taking it, however, on the whole the salesmen are not badly used and usually if he finds business pretty good he will put up with some inconvenience.

Western Optimism

The average dealer in the West is a natural optimist and if a line of goods looks saleable he will usually order a sample anyway, but of course the salesman must at all times watch his customer's stock to see that none of his line is sticking on the shelves and if he is the right kind of a salesman he will go to some trouble after hours in trying to help the customer sell the slow moving goods.

Different houses use different methods of merchandising their lines and jobber salesmen should watch that they do not get into the rut that seems evident in other lines. I refer to houses selling general lines of hardware, furniture, etc. Their salesman carries a catalog of very large proportions which is crowded with everything that a small town wants and it takes so much time to go through this catalog that before he gets well started the customer loses interest and it would seem that the salesman has not got a real chance to show his ability unless he concentrates on one or two lines and forgets the rest, which he can hardly do..

Dependence on Crop Conditions

A feature of business in the West that we are continually reminded of is that business has to rely a great deal on crop prospects. For instance, in Southern Saskatchewan and Alberta the farmers have had no crop to speak of for three years and the consequence is that the business men in towns in that district have a hard time financing. The farmers give notes, payable after the crop is taken off, and if there is a poor crop, there is usually a fair crop of notes to be renewed. But, even at that, the people in the districts mentioned are today looking forward to the present year with renewed hope and it must be admitted that grit of this kind will win out in the end.

Some years ago a crop failure covering a large piece of territory affected the whole West but the acreage has increased to such an extent that a partial failure is not felt so much.

Conditions such as mentioned call for aggressive salesmen who have the personality to keep the dealer from being down-hearted.

The Electrical Business

The electrical business as a business has improved in the past few years to this extent, that the average electrical dealer is today really selling appliances and supplies, whereas in the past the consumer stated what he or she wanted and all the dealer did was to take the money.

More improvement has taken place in the West in the past year which I believe has been due to a more friendly competition between contractor and dealer. Some dealers will say that business is bad and that when a job comes up that prices are cut so close that there is no use putting in a tender. This is partly true but you will find the successful contractor today does not take business at a loss and at the same time he is securing contracts. This is because he has taken as his slogan "Service;" I mean by that real service and the public will recognize it if the contractor will maintain a standard of service at all times.

Business conditions in the West are as yet of course in a serious state, but an improvement is in sight and all that is required is that all jobbers and dealers must keep to the front their most optimistic manner because one pessimist can do more harm than a hundred optimists can undo. Jobber and manufacturers' salesmen can do a great deal of good right now carrying to the dealer the gospel of more and better business.

Look for a Busy Season

Prices of electrical supplies are now reduced to such an extent that this Spring construction should be carried on, under almost a normal basis, and as there is a large amount of money that will no doubt be loaned out for building purposes, there is no reason why we cannot look forward to a busy season.

It is very noticeable during the past year that towns of any size are raising money to install their own electric plant, or, as is the case in Manitoba, are appealing to Provincial Governments for financial aid to secure Hydro power. This shows that the public recognize the need of cheap power and light and are willing to pay for it. If the general public recognize this, the electrical dealer should be on his toes all the time because towns in the West are composed of retired farmers to some extent and it must be demonstrated to them the ultimate saving by the use of electric power for household uses. He already knows the economy and comfort of using electric light but to increase the electric business in the West the consumer in the small town must be educated. Take for instance a four cent cooking rate and compare it with using a coal or wood stove; he has been using this kind of stove for years and years and if we want him to use electricity, we must put up strong arguments to offset the years of service the old stove has given him.

Farm Plants

The Farm Plant Lighting business is a branch all in itself; at the same time a large number of dealers in the West are using this as a side line. When an organization has been built up to sell farm plants alone, their business suffered considerably this last year and as there were not many plants sold to farmers the accessory end of business was equally as hard hit, but there is no doubt that when this farmer sees his spring wheat growing above the ground he will begin to look forward to a bumper harvest and again become optimistic.

One noticeable feature of the last year's operations was that the percentage of failures of electrical dealers in the West as compared to other lines of endeavor was very small which shows that the average electrical contractor has developed to such an extent that he is in the business men's class instead of being just a concern hanging out his shingle.

At a recent demonstration of appliances in a dealer's store the large crowd of attentive listeners which thronged the show-rooms demonstrated that the public want to know more about electric appliances and I would like to say in conclusion that we must all pay more attention to the selling end of our retail business and keep up the attention of the public. Financial conditions will improve shortly and if we have made a good job of educating the user of appliances the sales chart will look real interesting. The same applies to general supplies for building purposes, and education towards using more convenient outlets will boost the supply business if our information is correct that hundreds of houses will be erected this year in Western Canada.

What Electrical Manufacturers Can Do to Help the Retailers

By D. F. STREB

This is a question on which much can be said both pro and con.

All attachment plugs and the plugs entering the appliance should be standardized so that less would be necessary to carry in stock and so these could be manufactured in larger quantities at less initial cost.

All appliance repair parts should be lower in price, the present price for these parts if added together amount to almost twice the cost of the appliance. The discount on these parts is also in most cases less than the discounts on the appliance and in all cases too low to do business on, as anyone can readily see. 25 per cent is the usual discount, which gives a gross profit of 33-1/3 per cent out of which freight and express must be paid leaving a net gross profit of possibly 28 per cent which is less than the cost of doing business. In the matter of discounts on the appliances, these are also too low and barely enough to cover overhead expense.

Mr. D. F. Streb, Proprietor of The Electric Shop, Saskatoon

They tell us to raise the list price but this is not practical, as all retailers would not be on the same basis. We would also point out that in this western country the freight and express add greatly to the laid down cost, so that the list price should be higher or the discount larger than what is needed in the East or near the seat of manufacture.

In the matter of advertising more of this should be done in the home magazines and daily papers, there being only a few manufacturers who help the retailer in this way, the balance expecting the retailer to put their appliances across, which without their help is expensive and almost impossible, we have learned from experience to our sorrow.

There are a number of other matters that could be taken up, I would rather discuss these at a joint meeting of manufacturers, jobbers and contractor-dealers, which I would like to be called, to take place either in Regina or Saskatoon and to cover Manitoba, Saskatchewan and Alberta. I trust that the few thoughts which I have here stated will be taken up and an attempt made to remedy.

Electrical Industry Needs More Than Slogans

By M. E. DEERING
Winnipeg Manager, Northern Electric Co

Everyone seems quite willing to accept as a matter of course the idea of an athlete who intends entering a contest going into physical training. It occurs to me that if we in the electrical business could see our business in the light of a contest, the preparation for which needs careful mental training, we would be able to develop quite a few winners, as well as a large number of healthy runners up.

Business for the next few years is going to be a contest, and not a mere physical or financial contest, but one that calls for mental effort to a greater degree than at any time since the slump of 1907. We have heard a great deal in recent months about dull business, and more recently still considerable has been said along the lines of "Boost Business", "Quit Knocking", "Business is as Good as We Think it is", etc., and while as slogans these are all good, we need more than mere slogans. That Electrical business, which is organized on sound business principles and the human element in which is intelligently striving to find more and better ways of serving the buying public, has nothing to fear from the future. In spite of all the so-called dull business, restricted buying, severe credits, etc., the man who is devoting his entire time to doing business in an intelligent way is finding business to do, while he who is devoting himself to talking of poor business, the cut prices of his competitor, etc., is finding nothing else to do but talk. Except in such extreme years as 1918, this will always be true to a greater or lesser degree, and because I know that some people are going to buy electrical material this year, I believe that it is better to devote myself to the job of selling them than it is to waste time talking about those who won't buy.

Mr. M. E. Deering

1922 in Western Canada will see just that amount of electrical business that we in the indutsry create, and if we all take stock of ourselves and our wares, put our houses in order and go after business in a clean business-like manner, we will find that there is lots of good business to be had.

The field of illumination, for instance, has hardly been touched, and no matter what you or your competitor may have sold a purchaser in the past, he is still a prospect for more and better illumination.

In the appliance line we have the dishwasher which has yet to be really exploited, while the water heater at least on Winnipeg rates offers a possible sale to every household.

In spite of all that you may think as a result of your competitor's past cut prices, the fact remains that as a general rule the owner of the new home can be made to see the advantage of wiring for a range and convenience outlets if these be intelligently demonstrated.

If you have prepared for the overwhelming demand that is now existent for radio equipment you are enjoying the fruits of your own intelligent effort, but if not, then you are probably devoting a portion of each business day to complaining about your inability to get delivery, satisfactory prices, etc.

If you would do a large and successful electrical business, study that business and its every relation to the buying public, and you will find that your business grows as you grow mentally.

General Indications of a Betterment in Conditions

By G. R. WRIGHT
Winnipeg District Manager, Canadian General Electric Co.

While business throughout the Prairie Provinces is still offering only in small volume, there are general indications of a betterment in conditions; dealers' stocks are low; outstanding accounts are gradually being liquidated; materials being used are on a present-day cost basis; necessary economies have been effected, and the general operating efficiency of business concerns as a rule improved.

There is an increasing tendency from appliance sales and the sale of electrical specialties to enlarge the volume for the contractor-dealer, and he is rapidly learning to take advantage of the possibilities open to him.

A moderate amount of Government building will be undertaken in Saskatchewan this year. The indications are that in Manitoba the building program will be as large as last year, and that probably the number of small houses built will be greater.

Municipal expenditures are being restricted, but as a general rule the municipalities have no accumulated stocks of material for extensions of which the majority are in need.

Those concerns whose capital expenditures must be planned two or three years ahead, are showing their faith in the country by improving their facilities where necessary to meet the natural growth of business which has been experienced in the past. Active construction is proceeding on the plant of the Manitoba Power Company. As a result of this large development of cheap power, the prospects for electrical business in the city of Winnipeg and its vicinity are enormously increased.

While conditions in Manitoba and Saskatchewan have been under a period of severe readjustment, and while it is probable that this year there will not be a large volume of business offering, it is gratifying to feel as we do that the lowest ebb has been reached, and we confidently expect trade will again be on a normal basis in the comparatively near future.

Do Electrical Dealers Lack Pep? Are They Neglectful of Opportunity?

By a Farm-Plant Enthusiast

One of the really astonishing things in connection with the "Electrical Trade" to one who has been more or less interested in it for a number of years is the indifference, or shall we call it apathy, with which the legitimate electrical dealers throughout the Dominion of Canada as a class are overlooking or passing up the opportunities available in connection with the sale and installation of the Individual Electric Plant for the farm, country church, store, summer home, etc., which exist all around them in many cases, and in others are simply waiting for some energetic salesman to hustle around and secure.

There is no doubt that the "farm field" during the next few years will be one of the big fields for electrical merchandising, as the farmer is to-day a far more modern man than he was a few years ago, and not only appreciates, but wants the comforts, conveniences, and labor saving devices the city dweller enjoys through the use of electricity; and what is more he is going to have them whether he purchases them through electrical dealers, or through some free lance agent, wide-awake enough to go after him. The fact remains that no matter who gets him, he is well worth going after.

The Logical Man

By experience and training the electrical dealer and contractor is the logical man to handle the power and light problems in his community; in fact he has a very distinct advantage in every respect over the implement man or other agent usually found selling the farmers their electrical equipment except, shall we say, the inclination to get out and hustle for the business in which, by the way, there is an attractive profit and a large field.

Hydro activities in the various provinces, especially in Ontario, are reaching out to the farm to a limited extent, and thereby creating a considerable amount of business for local dealers, but the fact remains that it will be very many years before the vast majority of the farmers of Canada can possibly be supplied from central distributing stations, if they will ever be. In the meantime thousands of them scattered over the country are first class prospects for the sale and installation of a private system.

Doubtless the more or less crude equipments of some years ago, by courtesy called electric plants, with the constant servicing required, and at the best, uncertain service rendered, to a large extent caused the electrical dealer to fight shy; but the modern plant is a far different proposition, designed and built to give efficient service and not subject to the temperamental vagaries of its predecessors, and the selling of which does not let the dealer in for a lot of worry and trouble.

Easy to "Service"

The really modern plants are giving highly satisfactory service on thousands of farms and other private installations in the United States and Canada; so, providing a good plant is selected, there is no cause for worry as far as service is concerned, as that has been reduced to a minimum.

Many dealers and contractors will say they are too busy with town and city work, and have not the time to take on such a proposition, but the big business man of to-day is the one who in the years gone by, when he found himself in the enviable position of having all the business he could handle, did not stop and say "I will leave well enough alone" but began to expand in order to take care of all the additional business he could get, and kept up the expansion to keep pace with the possibilities offered. On the other hand the man who either does not look for, or else passes up, opportunities for increasing his business will always be one of the "little ones," and is not liable to make much business progress as the years roll by.

Farmer More of a "Shopper"

Generally speaking, selling the farmer is a little different from selling the town or city man, as the farmer is more of a "shopper" than the latter, does not make up his mind quite as fast and always buys more on confidence; but that feature is one to be desired, as when a particular dealer is established in the confidence of the farmer, he may rest assured that he is going to get about all of his business, and very likely that of his friends and relatives, as such things are discussed much more freely in the country than in the city and a lot of mighty good advertising is usually the result of satisfactory dealings with the farmer.

This big business opportunity lies right at your door, as we venture to say that there is not a village, town, or city in Canada surrounded by a prosperous farming district in which a little hustling on the part of a live dealer will not uncover a considerable number of first class prospects for a high grade reliable electric power and light plant. A very important feature is the fact that the sale of a plant invariably leads to the purchase of the various equipment and appliances to be used in connection with it, not to mention the wiring and fixtures, which in themselves are considerable items.

All of this business belongs logically to the electrical dealer, and can be secured by him if he is willing to make an effort to get it instead of letting it go by default to the implement man, lightning rod agent or the various other classes that seem to have been getting the cream of the business so far, simply because they were alive to the possibility and enterprising enough to get out and "cash in" on it.

Like Automobile Business

In 1910 the automobile business was beginning to clamor for recognition, and many who thought they saw possibilities in the sale of motor cars, and were able to make a start in a small way, have now a large and prosperous business; such examples are to be found in nearly every town and city. The main thing is to have vision and foresight to realize that a new era has dawned, and the determination to "get in on it" while the "getting is good," instead of wishing afterwards that you had.

The farm plant business is in about the same position to-day that the automobile business was in just a few years ago, and the expansion gives promise of being every bit as great in so far as the rural population is concerned; the invention and adaptation of the many electrical appliances for the lightening of labor and the increasing of comfort and pleasure makes electricity a valuable and economic servant of the farmer. It takes care of the many small chores that in the past have constituted the drudgery on the farm, and particularly wearing on the life of the female part of the average farm house by the use of the old fashioned broom, wash tub, churn, water pumping and carrying, flat iron, lamp filling and cleaning, and other numerous small jobs that are gradually sapping their health and vitality, and all of which can be made easy and pleasant by the aid of that wonderful servant electricity.

There is no field that offers such a wonderful opportunity for practical demonstration and sales promotion, attended with commensurate profits, and there is no person in such an advantageous position to take full advantage as the electrical dealer. Let "Do it Electrically" be your slogan, let the farmers in your district know in no uncertain manner that you as a practical electrical man, are the logical person to supply and advise on all electrical matters and moreover are prepared to supply both equipment and advice, also service, and the reward will be yours.

The thousands of automobiles in use by farmers today are there because some hustlers got out and sold them after showing the farmers that they could use them to advantage in their business and social life—just think of the sales possibilities of the farm plant that will give the farmer and his family pleasure, comfort, service and safety all the year round, no matter what weather conditions may be, as against limited service of the motor car—and you will not be lacking in convincing sales talk.

It is only a matter of putting the proposition fairly before him, and when you have sold him, and he is getting satisfaction from his purchase, the whole community knows it, is to a large extent influenced, and each succeeding sale comes easier.

There are several reliable farm plants now on the market, all nationally advertised and more or less familiar to the farmer in a general way. He needs the service such a plant will give him, and is waiting for some one to sell him. Will it be you, Mr. Contractor-dealer? Or are you going to hand this little gold mine over to the machine agent or to men of this type who have no knowledge of and no sympathy with the electrical industry, except that it brings them profits—profits that might and should go into the pockets of the electrical contractor and dealer.

The Art Electric Company, Guelph, Ont., have outgrown their old premises and have moved to larger quarters, at 104 Wyndham St. Messrs. C. C. Rasher and R. Armstrong are the proprietors.

The Electric Merchants' Opportunity—The Public Demanding Wireless

More surprises have been supplied by the electrical industry, probably, during the last 25 or 30 years than in all other industrial operations combined. Each time we think we have reached the limit of our surprises and then along comes another one more startling than any that have gone before. Take the present day development in wireless telephony that has jumped into prominence almost overnight. Five years ago it was a brave man who prophesied that "sometime" we might be able to hear across considerable distances without the use of conducting wires—and in the short interval equipment has been so perfected and simplified that it is almost within the reach of every home to "listen in" to the programs of music, news, and speeches being broadcasted from any one of a number of large sending stations at various points on the continent. We said "almost," and, generally speaking, there seems to be only one reason today why many thousands more of these wonderful sets are not in use, and that reason is—the factories can't supply them fast enough.

Viewed from the outside, it may look as if our people had gone crazy over wireless, but to the electrical man it is merely an over-due recognition of another commercial application of this wonderful form of energy. The man on the street probably looks upon this situation as a passing fad; the electrical man believes it to be as much a permanency—as much an essential in our daily life from now on—as the electric lamp, which revolutionized the science of illumination, just as wireless will revolutionize the science of the distribution of thought and expression.

The electrical dealer is, doubtless, due for a little temporary disappointment—because he cannot fill the orders that come to him. However, the meantime should be spent in perfecting his plans for distribution. This desire on the part of the public has come to stay. From the electrical merchant's point of view, it represents a source of revenue that will yield maximum results from minimum effort.

In connection with the inability of factories to supply the demand, Mr. T. E. Menzies, president of the A. C. Gilbert-Menzies Co., states that this condition is universal. Mr. Menzies has visited, personally, a number of the largest factories and jobbers in the United States and considers that a dealer would be well advised to figure on at least three months' delay, in starting his wireless supply business. Owing to the inability to keep pace with the demand for detector and amplifier tubes, the Mineral Sets will be on the market first, although in this connection the bigger manufacturers are sold out for the time being on account of being unable to get head phones. In regard to the Gilbert factory, Mr. Menzies states that though their sales staff has not been selling radio sets for four months previous to March 1, yet they are sold up two months in advance. Canada, however, will get her fair quota, based on weekly production, and Mr. Menzies is arranging to fill present orders starting June 1, shipping in instalments until the customer's order is completed.

The whole situation certainly indicates that the electrical contractor-dealer will be well advised in placing his orders immediately. Present indications are that the business will be at its height in the autumn of the present year.

The Manitoba Electrical Ass'n.

By MORRIS E. DEERING

I have often been asked "Do we in the Electrical Industry really need to be organized; do we need to have an Association, in order to be successful?"

Before attempting to answer such a question, I should like to make it plain that I believe the question is generally put without, what seems to me, a thorough understanding as to the proper and best functions of an organization of men in the electrical industry. Whether or not this seeming lack of understanding of proper functions is due to the history created by such past organizations as we may have had I cannot say.

Let us get a few fundamentals fixed in our minds concerning this industry of ours, and from there attempt to reason out the necessity, or lack of it, for the proper organizing of our industry. I believe that in the minds of all those who have given any serious thought to the matter that it is an accepted fact that our electrical industry renders a greater variety of services to mankind than any other single industry to-day. Just as man succeeds in finding more and better ways of causing electricity to serve him so will the industry grow. Growth of the industry is dependent on the ability of those connected with it to carry on intelligent research, development and educational work. This implies co-operation to a degree that is probably unequalled in few, if any, other similar industries.

How far could you, Mr. Central Station Manager, travel along your road if the engineer, the manufacturer, the jobber and the contractor-dealer were not constantly co-operating with you to provide more and better ways of enabling humanity to consume that "juice" you have to dispense?

How far could you, Mr. Manufacturer and Mr. Jobber, go if the central station man and the contractor-dealer refused to be interested in anything more than electric light? Suppose the contractor-dealer absolutely refused to bother with your time-payment plans and paid no attention to the new devices and appliances you know to be good.

How long would you last, Mr. Contractor-dealer, if the engineer, the manufacturer, the jobber and the central station all refused to listen to your demands for more satisfactory devices, more popular rates, etc.? Suppose that on all of your jobs there was absolutely nothing to wire for except lights.

Those responsible for carrying on the work of The Manitoba Electrical Association in Winnipeg have some such ideas as the above in mind. They look forward to the time when every member will see the advantage of taking his full share of the burden in carrying out the various plans that are from time to time mapped out, all for the betterment of the industry. When each man in our industry finds within himself a desire to help the industry in order to help himself, then will organization in Western Canada be found to be worth while.

The Manitoba Electrical Association, through their weekly electrical page, have, as can be proven by actual records of sales, improved the Electrical business in Winnipeg, and yet that page has largely been the result of the efforts of one or two men. How much more successful could it have been to date if every electrical merchant both wholesale and retail had taken full advantage of the opportunity to tell his story to the public, first through paid advertising and then through write-ups in the news space of the page. The use of the latter space is free and is not confined to advertisers alone.

Again, the Manitoba Electrical Association has given two demonstrations of the Electric Home before public bodies, and on each occasion the interest shown in convenience outlets and electric appliances proved that the public are waiting for the electrical man to show them the way to purchase wisely.

Those who criticize associations the most are generally found to be the least active in association matters. If every one in the industry could be aroused as to the amount of good that can be accomplished by a united effort to boost business, good business would surely follow. Electrical business, through electrical stores, can only become more than a mere saying when through co-operative effort those in the electrical industry prove to the buying public that it is to their interest to buy electrical goods from an electrical merchant. The old story of "If a man build a better mouse trap the world will beat a path to his door" holds good for us. The Manitoba Electrical Association, which to-day has a membership of 188, hopes by slow and sometimes painful progress to so weld its membership into one unified whole whose every energy is bent toward more and better public service as to make of our industry in Western Canada a business of which we can all be proud.

Turnover Can Be Increased 25 to 50%

Taken at random from letters received during the past month, from the most prominent central station men in the prairie provinces, we print the following extracts regarding the possibilities in the West for increased turnover of electrical appliances. They all speak with conviction:

By making all attachment plugs and receptacles standard and interchangeable, business could be increased considerably.

Turn-over of electrical goods could be increased 25 per cent.

Turn-over of electrical goods could be increased 50 per cent.

At the present time I believe that the opening is good for household appliances, especially cooking.

Washing machines and vacuum cleaners offer opportunity for live salesmen.

Turn-over of electrical goods could be increased 15 per cent.

Turn-over of electrical goods could be increased considerably by more display of goods.

Turn-over of electrical goods could be increased by greater co-operation, which is absolutely necessary.

Many electrical washers might be placed.

There should be a large increase in the sales of stoves, ranges, etc.

Think turn-over of electrical goods could be increased 25 per cent by greater efforts and co-operation by manufacturers and dealers.

Believe that turn-over of electrical goods could be increased considerably, especially if electrical washing machines were pushed.

The turn-over of electrical goods could be increased possibly 50 per cent by greater efforts and co-operation by manufacturers and dealers.

Interesting Views and Personalities

Further Information Regarding the Activities of the Prairie Provinces and the Personnel Behind Them.

The Moose Jaw Electric Store

The city of Moose Jaw, Sask., has an aggressive electrical firm, known as the Moose Jaw Electric Store, Ltd. They came into existence about a year ago and took over the city retail and contracting business of the Moose Jaw Gas & Electric, Ltd., which had been in business for some time and dealt largely in farm lighting plants. These two firms are at present located on the same premises, so that between them they cater to all classes of trade, keeping a specialty salesman on the road all the time selling washing machines and vacuum cleaners. Most of these sales are made on a monthly instalment basis.

The manager of the Moose Jaw Electric Store, Ltd., known as "The Electric Shop," is Mr. H. C. Hall. Mr. Hall is an Ontario boy, born in Blenheim and educated in Chatham. He was first with Wm Gray & Sons Co., Ltd., of Chatham, and was later manager of the Manitoba branch of Gray-Campbell, Ltd., for some time; in 1914 he was secretary-treasurer in their head office at Moose Jaw. In 1920 he started in the farm lighting game with the Moose Jaw Light & Electric Company, but almost immediately took charge of his own store, as noted above. The farm plant handled is that of the Dominion Steel Products Company, the "Dominion Light."

Mr. H. C. Hall

Mr. J. R. Young

Mr. Geo. A. Young

The Sun Electric Co., Regina

The Sun Electrical Company, Ltd., Regina, Sask., was operated by local men since 1913. It is situated in the centre of the retail section of the city. During the intervening period of nine years the size of the premises has been doubled and the staff increased from six to twenty-five members. This remarkable progress has taken place under the management of Mr. J. R. Young, who joined the staff as a clerk in 1914, but was promoted to the position of manager the following year. Since that time the assets of the firm have multiplied five times and Mr. Young is now majority owner of the stock. Mr. Geo. A. Young, father of J. R. Young, is also associated with the business. Mr. Young, Sr., is a thoroughly experienced business man of many years' standing, and has had much to do with the success of the company. The superintendent of the company is Mr. Garnett E. Perry, an able business man who is well known to the trade throughout Saskatchewan.

This company is thoroughly well organized. They issue price lists regularly, and catalogues; buy in large quantities----for example, washing machines are bought only in carload lots. The accounting end of the business is very systematically arranged. A card system shows the original purchasing cost, the wholesale selling price and the retail selling price; they carry forward purchase totals from preceding years and thus have on hand a record of all purchases for the past five years. The inventory is taken from the price cards on the first of each year, the quantity of stock being also indicated on the card itself. The card thus shows the record of turnover, by years, and is in itself a copy of the last inventory—a very valuable record, indeed, this company finds.

The Sun Electrical Company's store is one of the very finest in the prairie provinces. On entering the store the customer is at once attracted by the originality of the layout. Four pillars in white support the fixture room roof. Hanging from the sub-ceiling are all kinds of fixtures. On tables, also decorated in white, are reading lamps of every design. Between the tables, at selected intervals, mahogany standard lamps are placed; their dainty shades of old rose, blue and yellow complete a very effective color scheme.

The fixture room extends back about 18 ft. Running the whole length of the inside and end walls are shelves carrying shades in glass and wicker. The lower shelf contains large etched semi-indirect bowls, each bowl covering an electric light, controlled by a switch. When a customer wishes to select a bowl, the salesman switches on the lights, one by one, and each bowl is illuminated in turn. Every article in the fixture room is marked plainly with the price.

On the right of the main entrance, and opposite to the fixture room, three glass show cases containing percolators, vibrators, violet ray machines and all kinds of electric appliances are placed. There is also a mahogany counter at the back of the show cases and running parallel are mahogany fixtures, open below, containing lamps. Slide glass cases stand above the open fixtures. These are draped in black, as this color causes the electric nickel-ware in the interior of to stand out in relief; then further down are little square drawers which hold everythng from a fuse to a push button. At the end of the counter there is a small workshop, built of beaver board and easily moved at will; pushed against the wall with just enough room to enter, it is only large enough for one man, all minor repairs of domestic appliances are executed here. This little workshop has been a great convenience, and has helped to get through the little jobs with the dispatch that is pleasing to the customer.

At the back of the store is the office. This is open and the manager, from his desk, has a full view of the store. He thus not only can keep in touch with his staff but can see his customers. The store is decorated in blue and white throughout.

The space between the first pillar of the fixture room and the entrance on the left is reserved for washing machines and vacuum cleaners. A way of advertising the washing machine which has yielded good results is to place a machine filled with suds outside the entrance, almost on the sidewalk, in full view of the public; it is no unusual sight to see five or six or more people around the machine listening to a demonstration of its qualities. This method of advertising has been most effective as shown by the sales of this machine—twenty last month. Then there is a carpet to demonstrate the vacuum cleaner, and show how easily this special machine will remove every speck of dust. "Convince your customer that you have a good thing to sell him, and he will buy" is the motto, and it has met with good results.

Mr. Young is very proud of his store, and justly so. He says that he has frequently been told, by men who have seen the best electric stores in Canada, that there is no finer store than his in the Dominion. He adds "There are bigger ones, but none more attractive and more service like. We are pleased with it, but not satisfied. It has made us many friends, and every day the number increases."

History of the Great West Electric Co.

The extroadinary change that has come over the electrical supply situation in the past eight or ten years is well illustrated in the experience of the Great West Electric Company of Winnipeg, a reproduction of whose premises at 87 King Street is shown in this issue.

The expansion of business which has come to the electrical trade generally in the period mentioned has been shared by the Great West Electric Company fully, to such an extent that the company was forced to purchase a new building in October 1920, making the move into its new quarters in December, 1921.

To illustrate the growth of the trade generally by the experience of the Great West Electric Company, it is necessary to go back a few years. In 1912 the Mainer Electric Company was organized, and in 1916 its business was taken over by the Great West Electric Company, which was organized for the purpose. At that time J. Gordon Smith was appointed manager, the entire business was reorganized, the policy changed, and from that time to the present the record of the company has been one of continued achievement and prosperity.

At the time the new company was started the market in electrical supplies depended entirely upon the building operations. Coincident with the formation of the new company, building operations were at a standstill. New markets therefore had to be sought.

The way opened up in the realization of the cheapness of power in Winnipeg. The appliance business proved the medium for the needed expansion of business. Electric ranges, washers, sewing machines, and other domestic labor saving appliances were pushed, with the result that the appliance business grew rapidly and showed splendid results, which were increasingly added to as the supply end of the business gradually came back.

Home of the Great West Electric Co

In September, 1921, it was found necessary, due to increasing western business, to open a branch in Calgary to take care of the Alberta field.

The lesson of the progress made by the Great West Electric Company lies in the fact that this company took advantage of the situation, and whereas the bulk of the business prior to 1916 lay in the building being done, they recognized the possibilities of the appliance field and went after the business and got it, to such an extent that the appliance business which was at the inception of the company purely a side line has taken on itself the proportions of an industry in itself, fully as important and as profitable as the original field of supplies.

Other companies have had similar experience, with the result that the business of the electric dealer in Winnipeg has grown, his credit standing has improved, he has become a better merchant and the electrical industry has without question benefitted materially through the enterprise of this and similar progressive companies.

The Hillas Electric Co., Edmonton

Mr. C. W. Hillas, manager of the Hillas Electric Company, Edmonton, Alta., is another Ontario boy who went West and has made a success of business. He was born at Belfountain, Peel County, but when his parents moved to Calgary in 1899 he completed his education in the Calgary High School and started in the electrical business with the North West Electric Co. This was in 1906 and he remained with this company until 1911 when the North West Electric was taken over by the Northern Electric. In that year he formed a partnership with Mr. H. H. Depew, under the name Depew-Hillas Electric Company, in Edmonton. In May, 1917, he bought out Mr. Depew's interest and continued the business under the present name. In September, 1920, Mr. Hillas opened up a branch store, but in June, 1921, again combined his two stores at 10041 Jasper Avenue, in the very heart of the city. The Hillas Electric Co. have handled a number of the largest contracts during the last three years. They operate a fully equipped electrical store, contracting business and a motor winding department.

Mr. C. W. Hillas

Mr. Carl T. Kummen

Mr. J. H. Schumacher

The Schumacher Gray Co., Winnipeg

Mr. John M. Schumacher, president of Schumacher Gray Co. Ltd., Winnipeg, was born in Dubuque, Iowa, and received his education at Minneapolis Public Schools, graduating from the University of Minnesota. He is a member A.I.E.E., C.E.S., and E.I.C. For a time he was superintendent of construction for the W. I. Gray Co., Minneapolis; later construction manager for the Minneapolis Electric Equipment Co.; associated three years with Chas. L. Pillsbury Co., consulting engineers; then electrical inspector for the Minnesota State Board of Control. In 1911, he became associated with the Mitchell Gray Electric Co., Winnipeg. The name of this firm was eventually changed to Schumacher Gray Co. Ltd., and the business is still run under that name. Mr. Schumacher is a member of the Rotary Club, Manitoba Electrical Assn., and for the past five years has been a member of the Board of Directors, Winnipeg Builders' Exchange.

Messrs, Schumacher Gray Co. Ltd., are one of the largest firms of electrical contractors and dealers in Winnipeg, having done some of the largest contracting work in the city of Winnipeg. Being one of the most able electrical engineers in the city, Mr. Schumacher holds the appointment of Vocational Lecturer to the Winnipeg School Board. His chief hobby is baseball.

Mr. Carl T. Kummen was born in Norway, (the most intensely electrified country in the world). After coming to America he studied law for two years at the Lincoln-Jefferson University, Hammond, Ind., then studied industrial history and higher accounting for two years at the University of Minnesota. In the spring of 1912, he moved to Winnipeg, and joined the firm of the Mitchell-Gray Electric Co., shortly afterwards becoming secretary of the Schumacher-Gray Co., Ltd.—"The Electric Shop". Mr. Kummen served as secretary-treasurer of the old Winnipeg Jovian League for two years, and has always taken an active part in association work.

The Espley Electrical Co., Regina

From a very meagre start some three years ago the Espley Electrical Company of Regina, Sask., now enjoy a large share of the retail and contracting business of Regina and vicinity. Their store is located just around the corner from the main thoroughfare, in the heart of the business district. Here you will find a full stock of electrical appliances, fixtures, ranges, washing machines, and electrical supplies. They are agents for Turnbull freight and passenger elevators, Moffat ranges and Eden washing machines. Their business in electrical ranges during the past two years has been one of the largest retail turnovers in Western Canada.

Mr. Espley has long been favorably known in the Regina contracting field, and has successfully completed a very large number of the big electrical installations in this district.

The Electric Shop, Saskatoon

Saskatoon may have suffered from a boom in land values, but it boosts one of the most wide-awaks "Electric Shops" in the prairie provinces. Mr. Streb's, you say; yes, of course. Everyone in the West has heard of Mr. Streb's success.

Mr. Streb was born in Canton, Ohio, but, after a wide experience in the practical side of electrical contracting and installation, he came to Canada in 1907. For a time he was town electrician of Collingwood, where he was very largely instrumental in placing the electric light department on a paying basis, but in 1912 he went West and on reaching Saskatoon was appointed manager of the City Electric Company. In 1917 he bought this business out. In 1919 he moved to his present location, and in 1921, owing to the growth of the business, organized a limited company, including Mr. A. A. Murphy, B. Sc., A.M.E.I.C., formerly of Murphy & Underwood, as his partner. Mr. Murphy was born in Portland, Ont., and educated in Athens High School, Queen's University and McGill University, and Pittsburgh. He is also an Associate Member of the Engineering Institute of Canada. In 1911 he opened the first consulting engineer's office in the Middle West and supervised the installation of many plants, from his Saskatoon office, which included the towns of Wilkie, Assiniboia, Melfort, The Pas and others. He was an enthusiast in the use of internal combustion engines as a prime mover under conditions prevailing in that district. In 1921, as already noted, he took an interest with Mr. Streb in The Electric Shop, Ltd.

Mr. A. A. Murphy

Mr. Streb Answers Mr. Brettell re Discount on Lamps

Saskatoon, Sask.

Editor, Electrical News,—

I notice in your issue of March 15th a letter from a Mr. E. Brettell of Vancouver with reference to the discount on Mazda lamps on a consignment basis and would like to point out that the lamp business on this basis is the best paying proposition that the electrical dealer has in his store.

In the first place there is no investment in lamps, the manufacturer carrying the stock. The discount also on this basis is a great deal larger than on the old basis and in addition you get an extra 5 per cent for sending in a report at the end of each month of the amount of lamps that you have on hand and the amount of lamps that you have sold during the month, together with a cheque for the amount that you have sold, and for which you have already received the money.

With reference to discounts that are obtainable under class D contracts, i.e. contracts to consumers according to their requirements, I would point out that this is a very great advantage in allowing you to increase the volume of your lamp sales. While the discount left over after giving the consumer his required discount is not large, on the other hand do not lose sight of the fact that your extra discount that you obtain by increasing the volume is on your total requirements which, as you can readily see gives you an additional discount on the lamps which you sell over the counter at prevailing prices, without any investment whatever.

To sum up, the advantage over the old way is that you obtain an additional discount of about 9 per cent on the total volume you sell, besides having the advantage of making a small percentage on business which you would otherwise possibly not obtain.

Very truly yours,

D. F. Streb.

Three Well-Known Western Merchandisers

Mr. Edward W. Beard
Manager Budden-Beard & Co., Calgary

Mr. G. M. Wilkinson
Manager Cunningham Electric Co., Calgary

Mr. C. E. Dashwood
Manager Burnham-Frith Electric Co.,
Edmonton

Successful Ideas Put in Practice

By J. R. YOUNG

A tiny workshop, 6 ft. high, 6 ft. long, with two sides 3 ft. wide; inside is a work bench with tools suitable for repairs to irons, toasters, and other small appliances. Each side of the work bench is fitted up with shelves. Separate spaces are provided on these shelves for articles to be repaired; those that have been repaired; articles waiting for parts from the factory and, in addition, a stock of fittings—plugs, terminals, cords, etc.

The advantages of such an arrangement are that all appliance repairs are kept in order, the repair work is kept out of sight of the customers and the repairman is not annoyed by customers while working. The repairman can assist at the counter when necessary, as he is close at hand, the work-shop being placed at the end of the counter. Often a boy can be employed to do these small repairs and look after deliveries. The maintaining of such a repair booth promotes business and the Sun Electrical Co. find they are able to keep a boy busy all day on repairs in Regina, a city with a population of 34,000. Minor repairs should be kept away from the back shop: men working on large jobs do not like small work and, besides, their time is too valuable.

The Party is Over

By E. H. SMITH

The party is over, and it was some party while it lasted! Deflation is with us, and also with the balance of the world. This will lead to sanity and health. We all knew this adjustment had to come some time, so why feel blue and discouraged? We have been through the same thing before, and we will live through this adjustment period also.

We have the money, the credit, the factories, the labor, the material, the brains, the initiative, and we are naturally optimistic. Pessimism is a disease and follows poor circulation. Exercise is the best cure for it. Go out after the orders. Put jazz, pep, ginger into your efforts. Burn the crepe and jump on the crepe hangers with both feet. Wear out the shoe leather. You will probably get some business, and anyway it will help the shoe business.

Let Us Find the Silver Lining

Just as surely as there is a silver lining to every raincloud just so surely is there a silver lining to the cloud of business depression now hovering over us.

The rain-cloud's silver lining is the good old sunshine—powerful, unchanging, shining brightly.

The depression cloud's silver lining is the fundamentally sound condition of our great country—its limitless resources, its progressiveness, its men of brains. As manufacturers and dealers of the necessities and comforts of life we have a definite, important, useful place in the development of our country, and just beyond the present there's a real, lasting demand for these necessities—electrical appliances and equipment.

Let us make our product and service better than ever before; let us sell them on a broader scale; let us get down to intensive, intelligent hard work, with full faith that better business is within our grasp if we make the effort.

Messrs. T. Bellefleur & Chas. Skinner, Willow Bunch, Sask., contemplate the installation of an electric lighting plant at that place.

City of Edmonton—Public Utilities—Finance

By C. J. YORATH

During 1921 the financing of the public utilities, owned and operated by the city, namely, Electric Light and Power, Street Railway, Waterworks and Telephone, has been entirely readjusted and economies have been effected, with the result that the net deficit in 1920 of $94,867.00 has been converted to a net profit in 1921 of $263,855.74.

The net profit and loss of each of the utilities for the above years, after taking care of interest, sinking fund and depreciation, is as follows:

	1920		1921	
	Profit	Loss	Profit	Loss
Power Plant, Pumping Stn	563	6,242	74,172 15	
Waterworks	10,990		42,500.84	
Telephone	60,290		77,956.56	
Electric Light	39,723		114,200.99	
Street Railway		200,191		44,974 80
	$111,566	206,433	308,830.54	44 974 80
Net Loss	$94,867 00			
Net Profit	$263,855 74			

The city council has adopted the policy of taxing the utilities as though they were privately owned, and it is estimated that this year the utilties will make sufficient profit over and above all operating costs, including fixed charges, to pay by way of taxes the sum of $320,000.00 which will assist in reducing the tax rate of the city by over 5 mills. It is hoped, by the end of the present year, that in addition to the utilities making this large contribution towards relief of taxation on property, the rates for electric light and power and water will be reduced.

Suggestions by Western Dealer to Manufacturers

By J. R. YOUNG

1. Every manufacturer of larger electrical appliances should have some definite policy, and should have exclusive representation in the medium sized towns in Western Canada, so that where the local dealer advertises a line he will get all the results obtainable through the advertising.

2. There should be co-operative advertising.

3. Manufacturers should supply cuts and suggestions, with texts that can be used.

4. Should supply selling helps, of a good variety, window display cards, etc.

5. Should supply information on products where manufacturer's representative does not call on the dealer.

6. The dealers will not push lines where they have not got the exclusive selling rights.

Manitoba Power Co. Lets Contracts

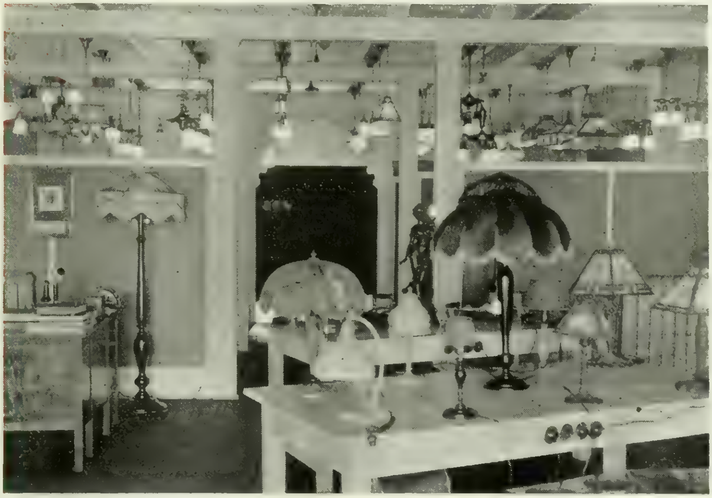
The contracts for the electrical equipment for the Manitoba Power Company's plant on the Winnipeg River have been let as follows: Two ATB-52, 21,000 kv.a., maximum rated, 90 per cent power-factor, 138.5 r.p.m., 11,000 volts, vertical shaft generators with 150 kw. direct connected exciters; six transformers W.C., 60 cycle, 7,000 kv.a. maximum rated, 90,000 volts; four H.T. oil switches, 90,000 volts. The generators and transformers are being supplied by the Canadian General Electric Co., and the high tension oil switches by the Canadian Westinghouse Company. The two turbines are being supplied by the Dominion Engineering Company, Montreal, and manufactured by I. P. Morris Company.

The Prairies Boast Some of the Best Electric Stores on the Continent

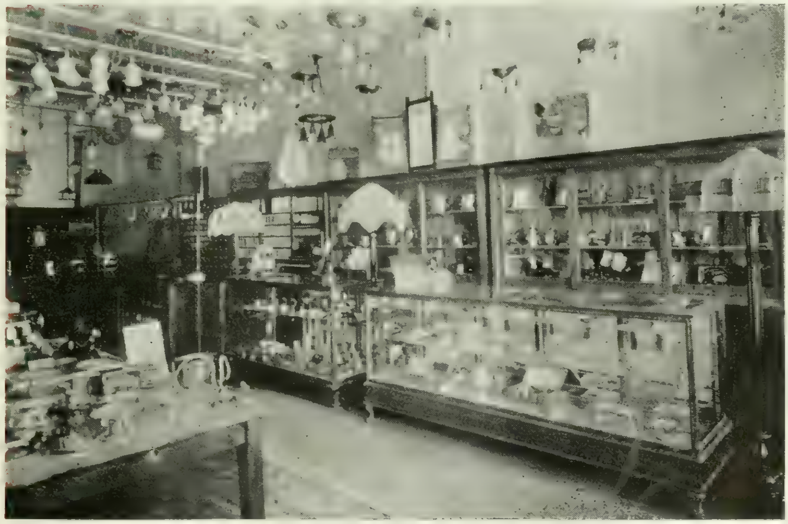
General View of Store of the Sun Electric, Regina

A line up that ensures certain surrender of the Calgary Housewives

Beautiful Interior Arrangements That Attract the Customer's Attention

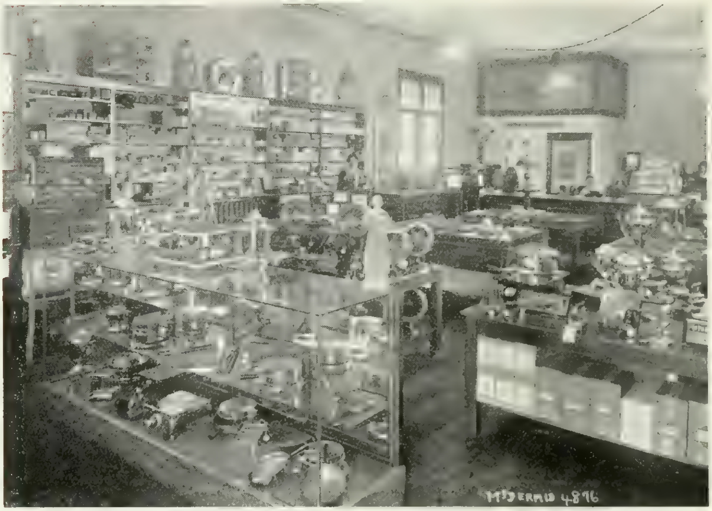


The Electric Shop, Moose Jaw. H. C. Hall, Proprietor

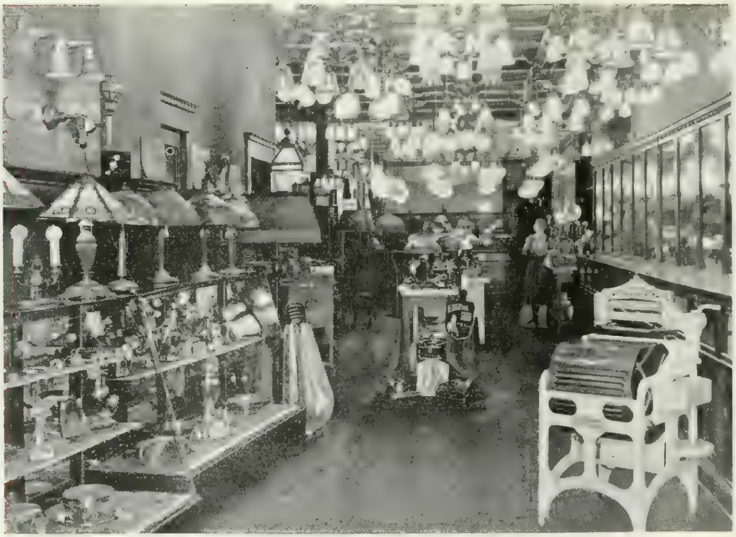


The Electric Shop, Saskatoon. D. F. Streb, Proprietor

Cities Vie with One Another in the Excellence of Their Merchandising Methods



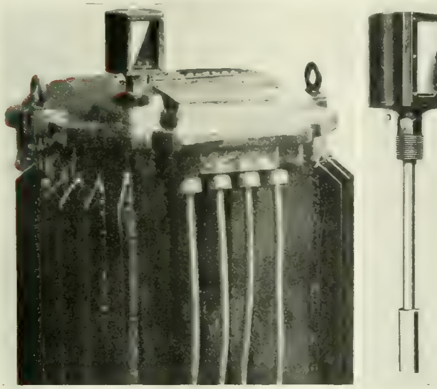
Burnham Frith Electric Company, Edmonton, Alta.



General Interior view, Cunningham Electric Co., Calgary

Latest Developments in Electrical Equipment

The Packard Electric Co., St. Catharines, Ont., have recently developed a new piece of apparatus, in the form of a transformer temperature indicator. This indicator operates on any transformer but is more particularly designed for the service type. At the present time it is very difficult to know the actual condition under which a service transformer is operating, the first indication of trouble generally being a burnout. The new Packard temperature signal indicates the maximum temperature, the indicator remaining at that point indefinitely, until reset by hand. This temperature reading can be plainly seen from the ground, so that an inspector can determine by passing along the street just what the operating condition in any and every service transformer is at the moment, or has been in the recent past.


Transformer Temperature Indicator

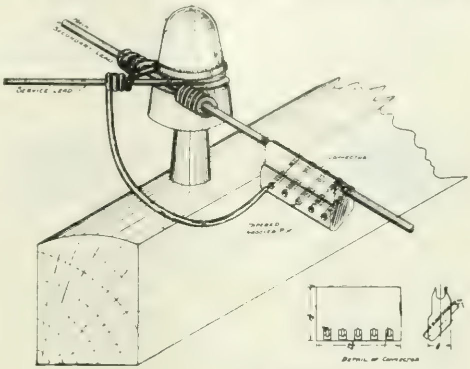
The indicator is in the form of a revolving frame, which is painted black up to a slanting line starting from the 90 deg. C. graduation; beyond this it is white. At 70 deg. C. a small portion of white appears in the upper left hand corner of the window of the metal case which encloses the frame. At 90 deg. C. all the window shows white except a small portion at the lower right hand corner.

The new device is rust-proof, weather-proof, oil-proof, bug-proof and fool-proof. It can be easily applied to any service transformer already in operation by simply drilling and tapping the cover with a ¾ in. pipe tap.

Service Connector

Where a large number of services leave the same pole considerable difficulty is encountered in making and disconnecting services, and after a service has been disconnected four or five times it usually means that the wire gets broken, and in the majority of cases the service eventually consists of a hook of wire round the secondary, and the first wind storm that comes up usually causes interruptions to the customer's service.

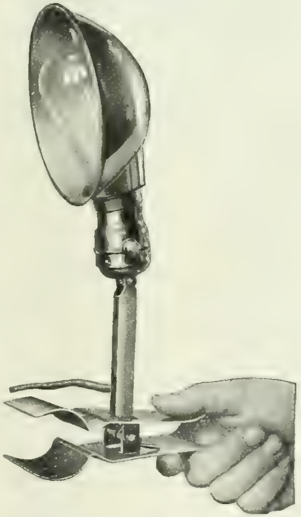
To overcome this difficulty the City of Calgary Electric Light Department has designed a service connector which is giving good satisfaction and has overcome this difficulty of loose connections, and also facilitates the connection and disconnection of customer's services. This device is made of brass and is soldered directly to the secondary, similar to the attachment of a trolley ear, but is in addition soldered. The house service is made by baring the service wire for about two inches, entering into a square slot and fastened by means of a tapered pin. A slight tap of a pair of pliers either makes or breaks the service.



Service Connector used in Calgary

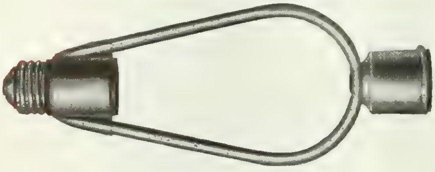
Banfield's Adjustable-Lite

Messrs. W. H. Banfield & Sons are now manufacturing the "Adjustable-lite" illustrated herewith. The advantage of this light is that it clamps or stands anywhere. It will clamp to a picture frame, to the head of the bed or side of a table, top of the piano or to a dozen and one other places where concentrated illumination is desired. It is made in a variety of finishes and is suitable for use in any room in the house or in any office. The spring controlling the clamp is sufficiently powerful to ensure the lamp remaining in place. The jaws of the clamp are padded so that the furniture will not be scratched or injured in any way.



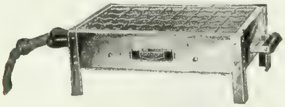
New Drop Socket

The Tri Novelty Company, of Wilson, Pa., has now ready for the market the drop socket shown. This new socket may be connected to any lighting fixture without removing the shade. It is thus a double duty socket, giving the use of the lamp within the shade and, at the same time, any appliance that may be attached to the lower socket. It is quickly attached or detached, being simply screwed in like a bulb. The lamp is first removed, the drop socket is inserted and the lamp replaced, leaving an extra socket below for any appliance.



New Models of Toaster Stoves

The Equator Manufacturing Company are placing on the market three new models of their toaster stove which has become so well known to the trade. Model A-11 is an aluminum frame with 6 in. square top, consuming 550 watts, and made to sell at a very low price; with or without cord. Model A-5 measures 5¾ x 9 in. and accomodates 2 pieces of toast. This is built of cold rolled steel, has a highly polished nickel plate finish; equipped with ebonite handle, standard terminals, 6 ft. of cord, with attachment and connector plugs; consumes 660 watts. Model A-3 has the same characteristics as Model A-5, but measures 6 in. by 6 in. and consumes 550 watts.



No. A-5 Full Nickel

Magicoal Electric Fires

Some of the beautiful models shown by the Magicoal Electric Fires (Canada) Ltd., in their Montreal showrooms give not only combustion effect, but flame effect which is very realistic, added to which many of the models can be fitted with what is known as the "back of grate" type heater, which throws the whole of the heat out into the room although the source of heat is out of sight. This combination of fire and heater enables one to obtain on a dull chilly day in Spring and Fall an excellent imitation of a hot coal fire, not only as regards appearance but as regards heat. The switching arrangements are such that the heat may be disconnected and the fire effect left running, so that even on a dull cheerless day in summer one can get the comforting appearance of the fire without the heat if desired.

The Magicoal company are in a position to supply grates suitable for rooms containing any period of furniture and would be glad to supply to anyone interested full particulars of their designs, heater capacities, etc. A new catalogue is in course of preparation and will be mailed on request; dealer-contractors are specially invited to communicate with the company to secure the fullest information.

A New Eureka

The Eureka Vacuum Cleaner Company, of Kitchener, Ont., have just announced a "New Eureka" known as Model 9, and offer it to their distributing organization as their conception of a bona fide vacuum cleaner, developed to the highest possible point of efficiency, simplicity, durability and appearance. The new Eureka has many improvements. What is spoken of as the most impressive feature is the 13½ in. nozzle, tapered at the ends to increase the velocity of air at those points. Other changes include the placing of the wheels in a prominent position behind the nozzle; an improved detachable "sweep action" brush; the one-piece oil tempered steel fan; the larger dust bag, of finer material and better design; added facilities for operating the cleaner under low furniture and beds; a new handle lock bolt; shorter handle and the addition of an efficient upholstery brush to the set of attachments. The manufacturers offer the machine, with all its improvements, at the same retail price; stand behind their products with the same service, and are confident that their engineering staff, in this new machine, have met the public demand for a better and more beautiful cleaner.

A Mov-a-long Electric Sign

The Mitchell Advertising Company, Third & Main Sts., Cincinnati, O., recently placed on the market this "Mov-a-long" electric sign, which is used chiefly in retailers' windows. It is electrically lighted and operated. Made in the form of an enamelled metal box, 9 in. high by 43 in. long with a 4 in. by 29 in. window, the device displays a lettered transparent film eleven feet in length, doubled within the box, which moves slowly to the right. Any advertising matter may be used, as the lettering is applied with water colors and may be removed with water and a clean cloth when a change of copy is desired, and the film used over again. The film is easily removable. A small universal motor, designed for either a.c. or d.c. current of 110 volts and equipped with adjustable speed indicator, is connected to a driving assembly for operating the film.

The Marchand Electrical Co., Banque Nationale Bldg., Ottawa, has secured the electrical contract on a Collegiate being erected at First Avenue, Ottawa, at an estimated cost of $700,000.

Mr. H. C. Budd has resigned his position with the Canadian General Electric Company of Winnipeg and had joined the Sales Staff of the Moloney Electric Company of Canada, Limited. Mr. Budd's headquarters will be in the Moloney Electric Company's Head Sales Office, No. 501, York Building, Toronto.

Electricity Beyond the City Limits

The Glamour of Light, the Luxury of Power, the Service that only Electrical Appliances Can Give, Are Within the Reach of the Country Man To-day

By E. A. LOWDEN.

Nobody questions to-day the advantages and the benefits which electric lights afford—to those who can have them. The question has been, largely, how best to get those lights. City folks have known all about the blessings of electric lights for a long time but to folks in the country, for a long time the only answer to the question of how to have electricity in the home was—move to town.

For a long time we have been comparing life in the country with that of our brothers and sisters in the cities. Modern comforts in the cities include a wide range of conveniences which folks there have come to accept as a matter of course. In the past, those on the farms could only envy the city folks and plan for the day when they, too, could give up the farm and fly to the city with its modern conveniences.

With the development of the farm electric plant, however, many of the city comforts have come to make their abiding place in the country and country life has profited accordingly. For the farm electric plant has come to be so dependable, so efficient and so economical to own and operate that the conveniences of electricity can be enjoyed on any farm.

A Mighty Appeal

The use of electricity on the farm has several different phases which appeal mightily to all the family. First of these will probably be the electric lights. An electric plant for farm service will not need to carry more than thirty or forty lights. These, properly placed, will give more light and immeasurably better light than could ever be enjoyed with the ordinary array of lamps and lanterns. They will be brighter, affording better living and working conditions, and they are much safer than the open flames of the old lighting systems.

On many farms and ranches, the electric power helps as much as the lights. Electric current is translated into power through the agency of the electric motor. Often the farm motor is mounted on a three-legged stand and provided with a handle so that it can be moved around from one machine to another, such as the washing machine, grindstone, churn and the like. They can be provided with an adjustable brace rod, with a hook that fits into a screw eye on the frame of the machine. This acts as a belt tightener, as well as a means of holding motor and machine firmly together.

Carrying Water

One of the most important and the most popular uses of power from the farm electric plant is for pumping water. A good many husbands, I believe, have never realized what a burden they have left upon the shoulders of the womenfolks, where it is up to them to carry the water for house use. Think for a moment of the country homes you know, where folks live the year round, taking the conveniences of those homes—and the inconveniences—as they find them. How many of these homes do you know of, where the well is away out in the dooryard, maybe down a hill, where some water-witch located the vein of water, years ago, with a forked stick. I have seen some of these wells a hundred feet or more away from the kitchen door, and wives and mothers in those homes had to carry the water for house use. By a simple process of arithmetic I could show you that, in instances like these, a woman will walk in the neighborhood of a hundred miles in the course of a year and carry tons and tons of water.

But that is not the point, so much as that farm homes are entertaining these out-of-date methods when they might be enjoying modern equipment and saving time—and improving health, besides. Where there is electricity at the farm home, it is possible to have a pressure water system, perhaps automatic in operation, at any rate one that will pump the water with electric power and deliver it under pressure to faucets wherever needed or store it in a pressure tank ready for use. Such a system makes possible a modern bathroom out in a country community, however isolated. It provides running water for the kitchen sink, for laundry tubs, for sprinkling yard and garden, for washing automobiles or carriages, for fire protection. It does away with pumping water for the stock, filling water troughs without any human labor or forcing it to drinking cups right in the mangers.

These drinking cups are more of an item, perhaps, in latitudes where constant stabling, or at least extended winter stabling is practiced. Dairymen who have adopted this plan, keeping pure water constantly before the dairy cattle, declare that it greatly increases the milk flow. Some say that the increase in milk thus secured will pay for a good automatic water system in less than two years with a herd of twenty cows or more.

In any event, having the water right at the turn of a faucet saves all the ordinary pumping by hand. The troughs are filled quickly and easily, and the labor thus saved from pumping can be put to good use in some other direction.

But the thing to be emphasized, however, is not that it saves time and labor for the farmer himself, to have the water pumped by electric power. It is rather that such arrangement saves those about the house from the work and trouble of procuring water for household use in the old way. And it adds so much to the life of the family—the conveniences it provides and the comforts it makes possible. Every member of the family will get benefit and satisfaction from this modern home equipment. The improved health and the increased pride which all will feel in the possession of the conveniences of running water for the home are features which in themselves are worth a considerable investment.

Farm Plants are Low Voltage

Generally, farm electric plants are of thirty-two volts. They have been designed in this capacity because, usually, an electric storage battery is a part of the electric plant and, since the commonly accepted lead-plate battery cell has a capacity of two volts, it takes sixteen cells to make up the farm plant storage battery. A high voltage battery would take fifty-five or fifty-six cells, thus adding materially to the cost of the plant.

Where the current is to be carried any considerable distance from the plant, however, 110 volts should be used. To carry low voltage current very far requires rather large copper wires and a pretty expensive installation, though this voltage is all right for farm buildings which are grouped within a few hundred feet of each other, as they usually are.

It is hardly necessary to dwell, in the columns of this publication, upon the benefits of electric lights for the home. What we overlook, sometimes, with regard to lighting the country home is, that with electric lights we will light up the kitchen, diningroom or living room on the gray, dark days when the house is gloomy because it is cloudy or stormy outdoors. That means light and cheer inside which drives away the gloom outside. During the course of several years of farm life I do not remember that we ever lit the coal oil lamps during these "gray days" but simply crowded near the windows or strained our eyes in the inadequate light. It just wasn't done—lighting lamps in the daytime. But I know that to-day, farmers who have these farm electric plants snap on electric lights during the dark days, saving many an eyestrain and a headache on the part of the shut-in members of the family who are bound to use their eyes whether the light is good or bad.

Light vs. Darkness

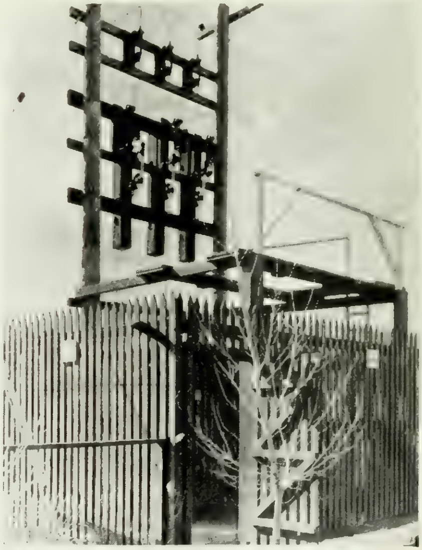
Eyestrain and headaches? Yes! Who knows but what these lights on dark days save some heartaches too. Imagine a tired mother and a house full of noisy children on a dark, stormy day on the farm. Add to that a husband and father who maybe doesn't take any too kindly to being stormbound with so much confusion. If the tension doesn't get too tight, so that something snaps and somebody's feelings get hurt along towards mid-afternoon, it is just because nerves are still too strong and hearts too brave—yet—to bend to the strain.

But if the home is brightly lighted, if cheer and comfort as manifested with electric lights can be had in the home, then mother's burden is lightened, the children forget to be "fussy" and the father can stay in the house safely all day without danger of doing violence to his own or anybody else's feelings or temper.

We don't need to dwell, much, on the advantages of electricity about the barn, except to point out the tremendous value the lights are at chore time; from the standpoint of time and labor-saving. Of course they save time and labor, for you just turn on the lights that cover the field of feeding operations and then go ahead just as you would in daylight. With the lantern, of course you have to be assured, first, that the thing is filled and the wick trimmed. Then you have to light it and see that the match stub doesn't set something afire. Then you have to get the lantern to the barn without a storm wind blowing the light out and holding up the feeding until you get lighted up and can start all over again. Next you must carry the lantern around with one hand and work with the other or get it disposed of so that it will not fall over, get kicked over or in some way set something afire—and that brings us to the question of safety. Most barn fires are caused through accidents with lanterns and matches and most barn losses include loss of livestock, feed-stuffs and farm machinery. A fire loss is a grievous wastage, something that can be avoided when the farmer's barn is eqipped with electric light, as so many barns are coming to be equipped, nowadays.

"Which Shall It Be?"

An even balanced day of work well planned;
An evening time of work well done,
Of rest and deep content?
A home where power and light combine for happiness:
Where power eliminates the ceaseless round of drudgery,
The tedious, irksome tasks of husbandry;
Where light takes up the burden of the setting sun
And makes the evening hours the best of all;
Where cheerfulness and helpfulness join hands to lighten labor?
Or shall it be a home of gloom and discontent,
Where toil takes toll of heart and mind and soul?
Where toilers eat—and sleep—and eat—to toil again;
Where children bow beneath the weight of never-ending chores,
Where men and women barter love and hope for paltry gain?
Then choose the home where power and light do their full part,
Transforming, at your touch, the tedious task, the darkened way,
Bringing the balanced day.
The evening time of rest and deep content,
The home where happy children play;
Where laughter lives, and joy and cheerfulness;
The home where leisure lengthens out the years—
Broadens the mind and lifts life to a grander plane,
As God intends.



Outdoor Waterworks Sub-station, Calgary

The Farm Plant and the Trade's Opportunity

By S. F. RICKETTS

There are considerations in the marketing of electric light and power plants that make it specially interesting to the electrical trade.

The first is that the electrical trade has, as a general rule, neglected to interest itself seriously in this opportunity for business, with the result that the distributing of lighting plant and accessories has in many cases passed into the hands of garages, farm machinery firms and specially organized concerns. Considering distributing only, the above phase is not so serious to the trade, in view of the fact that the distributing of electrical accessories and apparatus still goes through the regular channels, whilst the distributing of high priced technical machinery possibly calls for a specialized organization.

Electrical dealers, however, should be concerned with the way in which the retail plant selling has been almost entirely accomplished by men who had no knowledge of electricity. Force of circumstances has been partly responsible for this as electrical dealers have not been available in small centres where there was no other electrical power available, but even where there were electrical men in business, they have, to a great extent, failed to catch the vision of the possibilities in this line, and have neglected the opportunity which is knocking at their door.

There are several reasons why it is necessary for this work to develop in the hands of the electrical trade. First and foremost is the opportunity which it offers the small town electrical dealer and contractor for wiring work and apparatus sales, anl the prestige and introductions the sale of electrical units gives him with the prospective consumer. Then too, he is better equipped to advise on technical matters that crop up continually. If more of our small wiring contractors could combine some selling ability with their knowledge and experience and convey this with confidence to those who should and can install electricity, there would be a rebirth in the out of town business.

A great deal has been done during recent years to educate the prospective consuming public on the advantages of electricity for both light and power, and it is generally regarded as advisable by all modern farmers to have their houses wired when they are being built. This education has been largely carried on through the medium of farm journals and the individual plant salesman, but it would have far more weight if assistance was given by the technical man.

Large Number of Prospects

The importance of the issue is numerically sized up in the latest survey taken by a well known journal through a questionaire. Taking Canada as a whole, they have received a reply from 20,629 readers who propose to install electricity in their homes **soon**. Most of these readers are living out of town, hence the deduction that the trade should be prepared to take care of this potential business. Further, when these figures are compared with additional returns, and it is found that more people intend to install electricity **soon** than those who replied saying they already had electricity, there is certainly food for thought. What would happen if the trade seriously believed that they could duplicate the opportunity of the last twenty years in the next five years?

In the Western Provinces there are firms who have from 2000 to 3000 actual live prospects already canvassed in each province, each prospect having been personally quoted and had a layout given him for his work. These prospects are mostly eager to go ahead and only hard times and falling prices have kept them off the market.

When one considers that the price of the plant represents about half the contract price of the job, one gets a new view-point of the opportunity. The majority of houses in the country are not wired and this alone means from $150.00 to $300.00 for each store or farm. Many are indifferently wired by contractors or local general store tinsmith and unskilled workers. Instead of No. 12 wire or heavier being used, as is necessary on 32 volt work, where the current is heavy due to low voltage, there is often the cheapest grade and size of material. Fire hazard is not usually considered, and few provinces have any rules and regulations for 32 volt work. What is the trade doing to let this sort of thing continue?

Add the Appliance Sales

To wiring should be added the potential sale of every piece of labor-saving device on the market, for the farm is the place where the use of apparatus is appreciated.

Washing in the country cannot be sent out to the laundry; hence the washing machine is absolutely necessary. Irons are also needed, whilst the ¼ h.p. tripod motor is the handiest piece of apparatus around the home. It drives the churn, separator and fanning mill, besides a multitude of small tools. A good practical man, however, can carry conviction further regarding the use of the individual small motor which obviates the necessity of carrying the tripod motor around and lining it up for each particular job.

The vacuum cleaner has a great future for the country, although it is not every farm that is sufficiently furnished in carpets to make the expenditure worth while.

The water pump is a piece of apparatus that works 365 days in the year, and the possibility for the sale of deep well and shallow well, automatic and semi-automatic pumps is worthy of a special article.

The sale of other apparatus, such as 32 volt fans, toasters, percolators and the multitude of special fixtures and appliances, is simply a matter of educating the user, while the "bread and butter" business of the electrical retail merchant in lamps, fixtures, fuses, etc. is assured, but is to-day largely in the hands of the hardware merchant and general storekeeper. Present electric plant users are not half equipped with these lines; therefore, there is an immense field already waiting for development and eager to absorb all the information the dealer can give on such labor-saving devices.

When the sales organization of any particular branch of the electrical industry is planned, there is always consideration given as to how far the middleman can be eliminated between the manufacturer and the consumer. It is usually found, however, that the natural course must be from manufacturers through distributor and retailer to consumer and while this course takes its toll from the final purchaser, adding much to the difficulty of making sales, the route is, nevertheless, perhaps the most economical under present conditions.

From distributor to consumer is perhaps the most interesting subject for the reader. It is here that the electrical contractor has apparently failed to complete the circuit. When the distributor starts out to line up his selling organization over a large territory, he chooses one of the following three methods:

(A) A large block agent located in a central position commanding many villages and square miles of territory; equipped with a truck and a demonstration plant and with enough money to finance his business if he is compelled to give extended credit.

(B) An agent in every town, village or trade centre, with a limited control of his territory.

(C) Retail block salesmen employed by the distributor on salary and commision with power to organize and work his individual territory in his own way.

Organizations depends entirely upon the individuals after all, and for while "A man is known by the company he keeps,"it is nevertheless a fact that "A company is known by the man it keeps." The nature of the territory covered, together with climatic conditions, also have a lot to do with the organization.

If a distributor places himself in the hands of a large block agent, he must be convinced that the man is practical, technically sound and will work his territory in season and out. It is the most remunerative to the live salesman, but it is almost impossible for a man to cover a large block of territory and effectively call on all prospects. He must have some secondary agents in the smaller centres, keeping him posted on prospective business, and this means the splitting up of commissions. There is always the possibility that another concern will come along and pick off the secondary agent by means of a larger commission, but if he is capable and his advertising is effective, he can always offset this. Climatic conditions, too, affect the power of a large block agent, for if he is weather bound for the most effective six months of the year, he certainly cannot do justice to his territory. More sales are made between the end of the harvest and the beginning of plowing than during any other period of the year. Effective work, however, can be done throughout the summer months, but the results are with the man who arrives on the spot at the phychological moment.

Organization "B," which places an agent in every small town or trade centre has much to recommend it, although requiring more attention from the distributor. While the large block agent "A" should be a good electrical man, it is not easy to find these men in the small centres. The chief reason why the local agent is desirable is that he is in close touch with the individual prospect, knows his financial standing and can call him by his first name. The choice of agent in the small centre is limited to the usual machinery salesmen, hardware or general merchants, but their technical knowledge is limited, also their ability as salesmen is varied. More attention is required from the distributor, who is called upon to help close sales and must be constantly behind his agent keeping him at work. With this man, commission can be graduated, depending upon whether he has a demonstration plant and as to his ability to close individual sales. In other words, the distributor becomes his own block salesman and attends to wiring and service work with his own staff.

Organization "C" is only possible when the retail man has a closely settled district around a city, in which case he draws most of the commission that usually goes to an agency. If there are other practical men in the organization he need only be a salesman, but the opportunity is great for the combination of salesman-contractor working entirely on commision. He works out of head office, has no overhead apart from his car, and can become a super-carpet-bag-Ford-plant-contractor.

Where then is the opportunity for the electrical man? As a practical salesman building up his territory, he can have an electrical store in a good centre with a plant agency for a fair sized territory. Trying to play electrical merchant to more than one concern never got a man anywhere, for no one believes that he will not have leanings in the other fellow's direction and he falls between stools. As a service man he can charge for his labour, while his travelling expenses and lost time is not so much as service from a distant distributor. He has a wonderful opportunity of picking up all the lamp and accessory business in his territory, and can indulge in demonstration campaigns that always bring results. The business is waiting for the right men to "step in" and work.

"Service"

This perhaps is the most misunderstood term employed by the public. Gradually, education is convincing people that service costs money, and if they do not get it charged when the service is given, they must get it in another form. The automobile trade has managed to eliminate the "free service" idea, or at least reduce it to a minimum, and it is usually easy to convince the consumer that "service at cost" is more reliable than "free service" which may or may not have been covered by original commission.

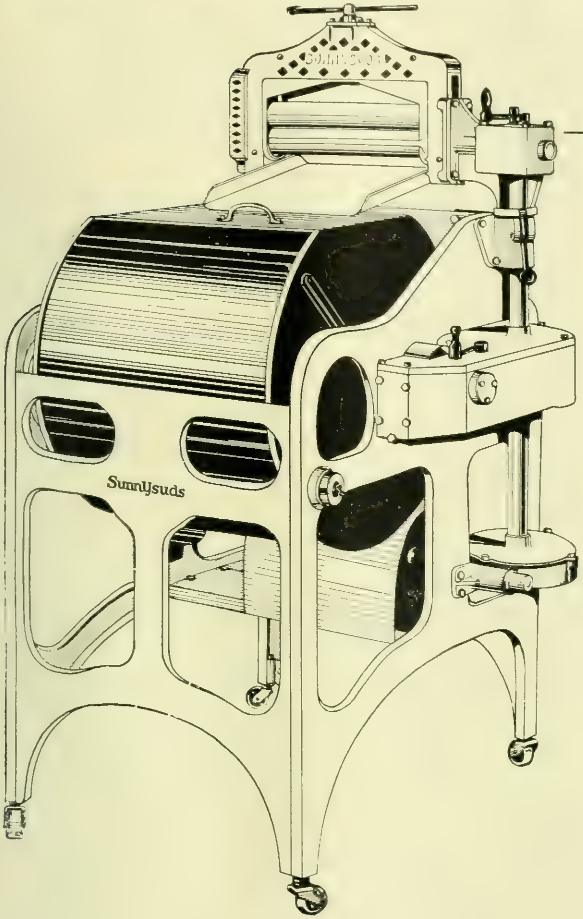
One of the disadvantages of the small local agent is that he knows little or nothing about service work, either on gas or electrical machinery, consequently service devolves upon the larger block agent or back to the distributor. The latter should theoretically have nothing to do with it, and it should be the work of the agent just as garage work is carried on in every decent centre and paid for at remunerative rates.

Less troubles arise with stationary lighting plants than with automobiles, hence there is a limited call for service. Most of the calls are due to ignorance on the part of the consumer, for every service man can recall trips made to find coal oil in the gas tank, or no fuel at all; fuses blown or wires off; slight ignition trouble or loose bolts, all of which could easily be remedied by the owner if a little more interest was taken. Hence as the most effective educator is the bill, there should be a bill for "service" of any kind. There is, of course, the point where service on defective parts should be covered by the factory, but the local electrical service man need never fear charging for services rendered as it is seldom disputed, and most factories are responsible enough to take care of defects. It is a strange fact that consumers do not like service charges from men who are not practical, however effective the service, as they look upon salesmen as people who float around living on air. Possibly they confuse the "hot air" expelled with their mode of living.

The B. C. Telephone Company, Vancouver, B. C., are having plans prepared for an addition to their Bayview Exchange at 10th & Yew Sts., Vancouver. An addition costing in the neighborhood of $40,000 is contemplatad.

Messrs. Schumacher-Gray Co., Ltd., 187 Portage Ave., Winnipeg, have been awarded the electrical contract on an addition being built to the building of the Great West Life Assurance Co., at Lombard & Rorie Sts., Winnipeg, at an estimated cost of $304,000.

The Washer You Have Waited For



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$150

Winnipeg and
the West

$165

Sunnysuds was not built to create a demand but to supply one.

Here you have a dependable (note that word) standard-size, sure-action, all metal electric washer retailing at a figure that makes buying and selling reasonable.

It couldn't be better built at any price, it couldn't be built as well for a cent less.

Wash your
Duds
in
Sunny Suds

To prove it, compare Sunnysuds with any washer at any price. If you haven't the facts we'll gladly supply them.

Dealer appointments are still being received. Have you sent in your application yet?

ONWARD MANUFACTURING COMPANY
KITCHENER - ONTARIO

SUNNYSUDS

Electric Washer & Wringer

THE SUPERB
—embodying mechanical refinements
EUREKA

NEW EUREKA

and improvements that will carry it to even greater heights of popularity!

Eureka Model 9 is now in the hands of Eureka dealers. The nation-wide enthusiasm which has greeted this latest product of the Eureka engineering staff is a warm tribute to the genius which has developed the refinements that make the Eureka even finer and more efficient than the winner of five international grand prizes. Each of eleven distinct improvements contribute to the rapidity and thoroughness with which the Eureka cleans, to its ease of operation, and to its ability to withstand gruelling service without failure and repair.

The nozzle has been lengthened to 13½" and its ends have been narrowed to increase the speed of the air at these points. This change now enables the Eureka to remove 95% of the clinging surface litter even without the aid of the improved "sweep action" brush. The new brush now permits a seal between floor covering and nozzle lips when clamped into position—a radical improvement representing the best combination of air and brush action. The wheels have been placed behind the nozzle—a change which not only permits easier cleaning against base boards and in corners, but which makes it unnecessary to adjust the nozzle for the different napped floor coverings.

For convenient use under low beds and furniture, the fan case exhaust vent has been lowered 3". The enlarged dark blue bag has added materially to the cleaner's appearance and efficiency. Additional refinements as the "pocket book" clasp which locks the bag to the fan case, the new handle lock bolt, the one piece, oil tempered steel fan, and the shortened handle have all added to the beauty, simplicity, and efficiency of this superb new Eureka.

Our own conviction that this new Eureka represents an epochal achievement in the vacuum cleaner industry was substantiated and strengthened by the unbounded enthusiasm of our leading distributors when they witnessed the first demonstration of the new model. The most significant part of their approval was their prediction that they would sell fifty per cent more Eurekas than in 1921—and in 1921 Eureka was the largest selling vacuum cleaner in the world.

A Profitable Cleaner Agency

To produce the maximum net profit, a vacuum cleaner must have mechanical excellence established beyond a shadow of doubt, it must be priced for mass appeal, it must be popularized by effective national advertising, and it must carry dealer discounts which leave a satisfactory profit after handling. The Eureka satisfies these four requirements. We invite correspondence from dealers regarding the dealer agency. Don't delay write us at once.

Eureka Vacuum Cleaner Company, Kitchener, Ontario

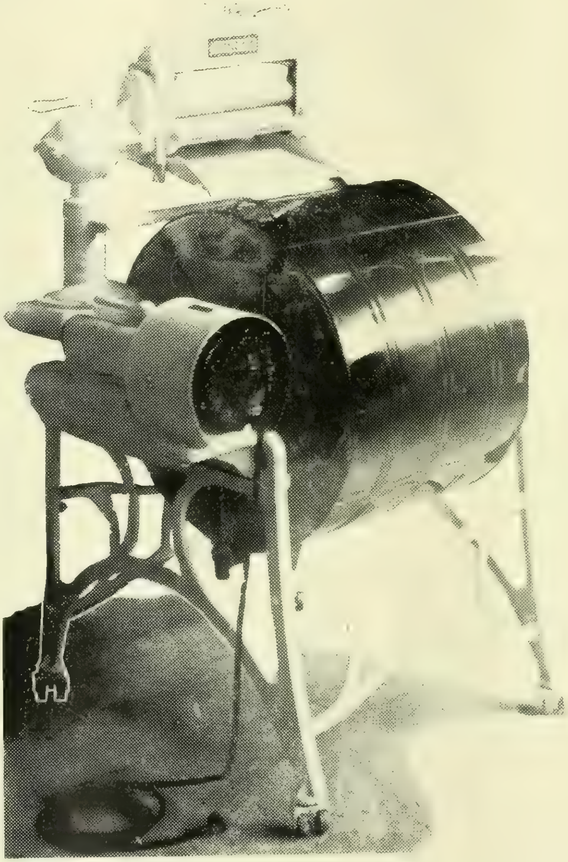
EUREKA

VACUUM CLEANER

The Best for the West

The "Dominion" Electric Washer

is the last word in electric washing machine design. It is an all-metal oscillating tub machine of full capacity with all the latest features and several exclusive features and refinements in design.



12" cast Aluminum reversible four position swing wringer with safety release.

Special Design Removable Copper Tub, Sanitary Style.

Control handles all polished.

Aluminium drip board.

Cut wringer drive gears.

Totally enclosed transmission.

¼ H.P. Robbins & Myers Motor direct connected through insulating coupling and safety overload release clutch to steel worm and bronze gear.

Practically noiseless — Removable tub and wringer make it the easiest machine in the market to deliver—only seven moving parts reduces maintenance to a minimum.

Highest grade workmanship and materials guaranteed.

The Most Attractive Proposition for Dealers in the Market

FOR PARTICULARS WRITE

Dominion Motor Castings Limited

Windsor, Ont.

Some Legal Aswects of the Lake of the Woods and Rainy River Situation

By EDWARD ANDERSON, K.C.

"When you realize that it is only a litttle over fifteen years since hydro electric energy from the Winnipeg River was first brought into Winnipeg to turn the wheels of industry in this city and in that short space of time there has been built up industries in which capital amounting to over two hundred million dollars has been invested, which industries are directly dependent upon the power produced from the Winnipeg River, you will realize what an important question this is, and how directly everyone of us and every citizen of Winnipeg is interested in it. The City of Winnipeg and the Province of Manitoba are particularly fortunate in having those tremendous possibilities of cheap power right at their doors.

The waters of the Winnipeg River come out of the Lake of the Woods—a great natural storage basin. These waters are obtained from the water-shed and from the drainage area surrounding the Lake of the Woods and Rainy Lake. In a broad way you may say the waters of the Winnipeg River come from Rainy Lake, Rainy River, and the Lake of the Woods. The water-sheds from which these waters come aggregate some twenty-eight thousand square miles. You will see what a tremendous area that covers. All these waters drain into this natural basin and flow down into the Winnipeg River, and by the reason of the conformation of territory these are created these water powers which we have already commenced to harness. It is important, therefore, to know what is the regulating or legal power over these waters. When you realize that Rainy Lake, Rainy River, and the Lake of the Woods are international waters, or boundary waters, lying between the United States on one side and Canada on the other, you can see how necessary it is that regulation should be properly enforced. The question of regulation is one which engrossed the attention of authorities for a great many years. Away back in 1887 the Dominion Government gave a grant towards the building of what was called the "Roll Away Dam" at the outlet of the Lake of the Woods, which dam had the effect of raising the water in the Lake. At that time the principal object was for the purpose of navigation, but now navigation is only a secondary matter and power the all important one. The next thing that was done that affected the levels of the Lake of the Woods was the erection of the Norman dam at the outlet of the Lake of the Woods where the Winnipeg River flows out of the Lake. It was built by a private company and shortly after an arrangement was entered into by that company and the Ontario Government whereby the Government paid $4,000.00 to the company for the privilege of regulating the stop-logs in that dam. This was to regulate the waters for navigation because even then the question of power had not become paramount. The effect of placing those dams was to raise the water in the Lake and the inhabitants of the southern shore on the Lake of the Woods in Minnesota complained through their government that a great deal of damage was done to their holdings. The result was that the question of the damage was referred to an International Joint Commission. The Commission was brought into being by joint legislation of the Dominion of Canada and the United States in 1909 whereby the question of international waters and in fact all other questions referring thereto, and disputes which might arise between the United States and Canada were to be disposed of by this International Commission.

It was a very fortunate thing that there was such a commission for such a purpose as this because if the questions had to go through the ordinary diplomatic channels they would not have been settled for a very long time and most likely settled in an unsatisfactory manner. The two governments realized that it was more than the question of the flooding of these lands which was at stake, with the result that a set of questions were submitted to this Commission, the effect of which was that they were to investigate and find out what was the most advantageous use to which the waters of the Lake of the Woods could be put. That Commission sat and took evidence and heard arguments for a period of three or four years and finally made its report. In my capacity as Counsel for the Dominion Government I had the privilege of attending before that Commission and know a great deal of what went on before it, but the most important work done before that Commission was done by the Water Powers Branch of the Dominion Government, at the head of which was Mr. Challies, and whose representative here is Mr. Atwood. That department had in mind the tremendous importance of power development on the Winnipeg River and they kept that in the forefront all the time. The question of navigation and the fisheries, and other questions came up but by reason of the energy and the foresight of the Water Power Branch at Ottawa this question of power was kept in the forefront all the time, with the result that the Commission in making its report had prominently before it the utilization of these waters for power purposes and recommended to the two governments that certain levels for the Lake of the Woods should be adopted. The Commission also disposed of the question of damages on the south shore of the lake.

They recommended that certain levels should be adopted and certain methods used to provide a continuous and dependable flow from the Lake of the Woods down the Winnipeg River. The way in which that was to be accomplished was to keep the levels of the Lake of the Woods at certain points and the report recommended certain improvements to the outlet of the Lake. It was necessary in order to get a proper flow of water that the outlet should be enlarged and certain regulating works should be put there. Those regulating works have not yet been put in but there is no question they will be put in so as to get the best use of the water in the Winnipeg River.

Norman Dam Key to Situation

During the course of the hearing before the Commission it became evident that the strategic point or key to the whole situation was the ownership of the Norman dam. Unfortunately, as you know, governments move slowly and an ambitious and enterprising gentleman named Backus got in ahead. That created a very difficult and unsatisfactory situation so far as the water powers of the Winnipeg River were concerned, because Mr. Backus is more interested than any other single individual or combination of individuals in the waters of the Winnipeg River, Lake of the Woods, and Rainy Lake. As you can see, that created a very unfortunate condition of affairs. The Dominion Government woke up a little too late and realized that it was up to the Dominion Government to take some steps to straighten that out. The thing that brought the matter to a head was the granting

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Before Manitoba Electrical Association.

by the Ontario Government to Mr. Backus of the right to develop the power site known as White Dog Falls on the Winnipeg River, and at this point let me tell you about the jurisdiction over the waters of the Winnipeg River. These waters are situated partly in Ontario and partly in Manitoba, the most important water powers of the river being in Manitoba, while White Dog Falls is the most important in Ontario. Because at confederation the natural resources of Ontario were conveyed to it, Ontario owns its own water powers and, therefore, owns and controls the waters of the Winnipeg River within the boundaries of the Province of Ontario. As the Province of Manitoba has not yet received its natural resources, the waters of the Winnipeg River lying in Manitoba were and are under the Dominion jurisdiction and have been administered by the Water Powers Branch of the Dominion Government at Ottawa. In my humble opinion, it was a fortunate thing for the people of Winnipeg and Manitoba that the waters of the Winnipeg River in Manitoba are and have been administered by the Water Powers Branch at Ottawa, and I will point out why I think that is so.

Concession to Backus

The concession to Mr. Backus raised the question pointedly and directly, and you will see in what respect it was important there should be some jurisdiction in the Dominion Government. I understand this question is now being discussed by the Engineering Institute and that a committee is appointed to investigate and report on the question. So far as my experience and knowledge goes, I think it is of importance that the administration of those water powers should continue vested in the Dominion Water Powers Branch irrespective of whether or not the natural resources are transferred to the Province. I am quite sure that whatever Provincial Government is in power at the time they are turned over, that government will agree with the statement I am making now. The reason why it is important that the control should remain at Ottawa is this. As soon as Mr. Backus got this concession at White Dog, and bearing in mind he had the Norman dam, it was realized at once by the people here that he had a control that was liable to be inimical and very destructive to the power users on the Winnipeg River down below.

The City of Winnipeg, the Province of Manitoba, and the Winnipeg Electric Railway Company, all got busy when this state of affairs arose, with the result that after a great deal of negotiations and discussions and representation, the Dominion Government became fully seized of the situation and the Ontario Government was made aware of the situation through Mr. Drury, the Premier. The Dominion Government and the Ontario Government agreed to introduce joint legislation to control the outlet at the Lake of the Woods, and thus control the flow of the water down the Winnipeg River. Up to that time there was no regulation, and no statute in force whereby any government could come in and take control of the situation. Those interested were absolutely at the mercy of the private interests who controlled that outlet and owned other concessions on the River. The two Governments promised to pass concurrent legislation. This was necessary because Ontario owned her water powers, while the Dominion Government had control of the water powers in Manitoba. The bill was presented to the Dominion House and passed into law. In the Ontario House for some reason it was not passed and the result, therefore, was very unsatisfactory.

Ottawa Legislation

The legislation was passed at Ottawa, the legislation was held up at Toronto and the whole thing was in the air. The remedy adopted was this—the Dominion Government passed an independent act and in connection with that act, I can demonstrate to an absolute conclusion the necessity of having control of these waters in the hands of the Dominion Government. They passed this act which had for its express purpose the controlling of all works on the River and the outlet of the Lake. There is a very simple device by which the Dominion Government can obtain jurisdiction over Provincial undertakings and that is to pass an act declaring the particular works to be "For the general advantage of Canada." In that act they declared that all works at the outlet of the Lake of the Woods and at the English River from Lac Seul, (which has an important bearing on this question) were for the general advantage of Canada, and thereby, by that act, they became under the jurisdiction of the Dominion Government. Otherwise, as I say, there was no method of exercising that jurisdiction. Suppose, for instance, that the jurisdiction rested not with the Domnion Government but with Manitoba, there would have been no adequate means by which the Manitoba Government could have controlled the situation. All that it could possibly have control of would be that portion of the Winnipeg River situate within its boundaries and as the controlling situation was in the Province of Ontario it would have nothing to say about it at all. But by reason of the passing of this act the Dominion Government got complete jurisdiction over the matter. Among other things that the act provided for was that one of the recommendations of the International Joint Commission should be carried out—a Board appointed to have jurisdiction over the flow of water in the Winnipeg River and outlets. That Board was appointed and I understand is now functioning. By that act these waters came under the jurisdiction of the Dominion Government and the government took immediate and active steps to maintain that control.

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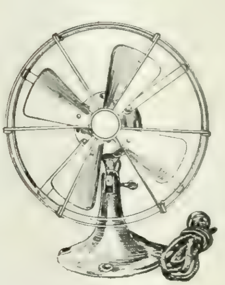

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Filling up the Valleys

In spite of the tremendous developments and refinements that have been brought about in the electrical industry during the last ten years, there still remains that old problem of peak load, on the one hand, and the deep valley in the curves, on the other hand. The load-factor is still low, though the overhead, the maintenance and the capital carrying charges still work 24 hours a day. Any suggestions, therefore, towards improving these conditions are always hailed with interest and pleasure by the industry.

Such a suggestion comes from F. T. Kaelin, the well known hydro-electric engineer of the Shawinigan Water & Power Company who, in a recent address before the Engineering Institute of Canada, spoke of the economic uses of electricity for producing steam for heating and other purposes in off-peak hours, thus helping to straighten out the kinky curve. Mr. Kaelin has invented a steam generator, which is exceedingly economical in construction and, of course, practically 100 per cent. efficient as regards the transformation of electrical energy into heat. This generator has been used to good advantage at different points in Quebec province where conditions are favorable; for example, in a pulp and paper mill where an ample supply is available near at hand. Mr. Kaelin cites, for example, the case of the use of electrically generated steam over the week-end, and states that it is economically quite feasible to turn power that was used during the six days, —mainly for pulp grinding—into steam on the 7th day. He stated that a recent investigation proved that the saving of coal during the 52 Sundays and three holidays more than paid for the installation of the steam generator. The electric energy used during these off-peak periods would otherwise go to waste.

The low cost of Mr. Kaelin's electric steam generator, we understand, is due to the fact that he uses the water itself as the resistance, varying the distance between the electrodes as the demand for steam varies.

This idea of utilizing electricity to provide steam heat during short periods when the plant is shut down is one that may easily appeal to a number of industries. It is always just about as costly an operation to keep a factory or office building heated by coal during holidays and Sundays as it is during the working days, and if Mr. Kaelin has a commercial proposition to offer to different industries whereby they can utilize electrical energy for heating purposes on the seventh day that is used the other six days in factory production, he has made a very important contribution to the electrical industry's economics.

Government Extends Rural Aid

It will be remembered that at last year's session of the Ontario Legislature an Act was passed whereby the Government undertook to bear 50 per cent of the cost of certain rural primary distribution lines. Considered from the angle that it places the blessing of electricity within reach of a larger percentage of the rural community, this Act had universal approval, but judged on a basis of legal equity, nothing more unfair was ever placed on the Statute books. There is no more reason why farmers should be presented with a transmission line at half price than that the residents along a city street should be treated in the same way. It was an iniquitous form of legislation that got by without serious objection, simply because every city man realizes that life on a farm, under the best of conditions, has little enough of luxury.

The matter has again been brought to the attention of the country through a Bill being introduced at the present session of the Ontario Government to extend this privilege to municipalities that may be in a position to purchase power from private companies (the original Act applied only to the Hydro-electric Power Commission of Ontario). It is not the intention of this session's Bill, apparently, to allow any rebate to a private company that may be constructing primary lines for rural distribution, but it provides machinery whereby a township or a group of farmers may build primary lines and own them, the Government paying 50 per cent of the cost. This will benefit the private company to the extent that it will not be required to put up fresh capital for these extensions.

Coal Sometimes Cheaper Than Water Power

With our abundance of water power in Canada, and with many fine examples of development work carried out at low cost, there is a natural tendency to look upon all water power development as economical and certain to result in low power rates to the consumer. We are apt to forget that conditions vary greatly with localities; that the size of a station has a marked effect not only on its capital cost but also on the cost of maintenance and operation; that the proximity of coal may reduce the cost of steam operation to a point where water power cannot compete.

A case in point is the evidence of R. A. Ross, recently given before the New Brunswick Power Commission. The province of New Brunswick is just putting the finishing touches to a 10,000 h.p. hydro-electric plant, but Mr. Ross told the Commission that he could build a steam plant—presumably in St. John, where this hydro-electric power will be delivered—that would knock the spots off the hydro plant, so far as power costs were concerned. Mr. Ross has had more than ordinary experience in the utilization of coal and his statement is thus of more than usual interest.

If this 10,000 h.p. plant had been constructed in a district far removed from an ample coal supply, no doubt the story would have been different, but it goes to show that we must not take it as a foregone conclusion that every water falls can be economically developed, whatever its size and wherever its location.

Mayor Tisdall, Vancouver, Extols B. C. E. R. Service

Mayor C. E. Tisdall, of Vancouver told the Electric Club of that city at luncheon on March 24 that the board of aldermen had authorized him to look for an engineer of wide experience in the hydro-electric field for the purpose of advising the civic authorities on the subject of developing electric energy for Vancouver. While this had been done, the Mayor was careful to say that no definite policy had been decided. It was, however, expected that during the coming summer information on the subject would be assembled and when the council had such reports in hand, the question of a hydro-electric installation controlled by the city as against the present established service would be put up to the ratepayers. Speaking as a layman, Mayor Tisdall, in a very careful and conservative statement, pointed out that the mere existence of a waterpower did not argue for its development. The economic development of a power was a main factor in its success. Then it was still a moot question, the mayor said, as to the relative advantages of public and private ownership, as to whether a publicly owned utility can get the efficiency possible through a private corporation. He spoke also of such fundamentals as the financial statement, in which proper allowance must be made for depreciation, etc., in order to have a publicly owned project on sound basis. Financial statements, showing revenue and expenditure, might look very well until the groundwork was dug into. It was imperative to maintain an equal balance between revenue and expenditure, and incidentally the mayor pointed out the difficulties the 1922 council had just been contending with on that score. A great many people had attended at the city hall to complain of the high taxation, and when the estimates were being considered an equal number of people attended urging various expenditures. It was axiomatic that if the people asked for service someone must pay for it. That was true of all service, whether electric or otherwise.

In his introductory remarks, Mayor Tisdall commented on the development going on in the use of electricity. Time was not so far back but that many of his own age could remember when the candle was the only light. Today the electric light was universal, as also was electric power. He predicted that electric cooking in the homes of all communities would soon be general to the same degree as light. He knew of no branch of industry or engineering which offered such an attractive future for the young man as the electrical field. Before concluding his remarks, Mayor Tisdall paid a compliment to the present electric service of the B. C. Electric Railway Company. Vancouver and its environs were well served by the present company, he said The fact that his council was inquiring into the question of a civic hydro-electric plant was no reflection on the B.C.E.R. Co. Vancouver could not fairly compare its present rates for electric energy with that of Winnipeg for the latter city had had particularly favorable conditions in establishing its hydro-electric power plant. But Vancouver, he said, does compare favorably with most cities. Present rates were not unreasonable and "we have an abundant service."

Utilizing a Refrigerating Plant for Heating Purposes

When Mme. Galli-Curci sang in Vancouver on March 29th the only auditorium of sufficiently large proportions to accommodate the expected audience was the Arena skating rink. Vancouver is the place where they have to make artificial ice for their skating rink, even in winter. But the cold storage atmosphere was not conducive to the best efforts of even a prima donna, to say nothing of the comfort of the audience. It was, therefore, decided to heat the Arena. The idea was to reverse the usual process by which the ice on the skating floor was formed. So the problem was put up to the engineering department of the B. C. Electric Railway Company. Here is how they solved it, the installation and test being completed in forty-eight hours—incidentally, it is the first time on record when such a method of heating electrically was ever tried. The results were entirely satisfactory, the large audience which packed the great Arena enjoying the concert with all the comfort of a theatre.

The circulating pipes for the artificial ice system are installed in parallel lines between parallel headers laid in sand under a hardwood floor, on which the ice film is ordinarily formed. There are 53,500 feet of this pipe, which is 1¼ inches in diameter. To heat these coils the method adopted was as follows :

Three sections of ¾ in. pipe, 250 feet long, were coupled in delta and immersed in the 25,000 gallon brine tank. After being heated to pre-determined value, the water was circulated by a 600 gal. centrifugal pump. Elements were supplied by a 650 kw. transformer, 2200/110 volts, coupled in parallel delta, the current on the 2,200 volt side being 90 amperes.

After heating the tank water for twenty-four hours, the temperature of the water in the tank was raised in that time to 160 deg. F. and then circulated by means of the pump through the pipe system for three hours. The following figures show the result :

Before circulating : Temp. of tank water, 160 deg.; temp. of floor, 49 deg.; temp. outside bldg., 43 deg.;

After circulating 3 hours : Temp. of tank water, 106 deg.; temp. of floor, 59 deg.; temp. outside bldg., 41 deg.

During the 30 hours' run in which the temporary heating plant was used, the power required was 9,000 kw. hours. To give a more definite idea of the heating problem solved in this original manner, the following dimensions are furnished :

Height of building	60 feet
Width of building	135 feet
Length of building	260 feet
Area of exposed walls	47,400 sq. ft.
Brine tank capacity	25,000 gals.
Piping system capacity	5,000 gals.
Lin. ft. pipe under main floor ...	53,500ft.
Size of pipe	1¼ in.

American Institute Electrical Engineers Holding First Convention in Canada

For the first time in its history, the American Institute of Electrical Engineers will hold its mid-summer convention in Canada. Niagara Falls, at the Clifton Hotel, has been chosen as the rendezvous and Canadian members are asked to cooperate in every possible way to make the event a success. The date has been fixed as June 26-30—an ideal date, as well as location, for a little holiday.

Toronto Section A. I. E. E. Closes the Year with Three Rousing Meetings

The American Institute of Electrical Engineers, Toronto Section, held a joint meeting with the Hamilton Branch of the Engineering Institute of Canada, in the Westinghouse auditorium, Hamilton, Ont., on March 24. The meeting was opened by Mr. H. U. Hart, chairman, Hamilton Branch E. I. C., who following a few words of welcome to the visitors, called upon Mr. Dobson, chairman of the Toronto Section of the A. I. E. E., to preside. Mr. Dobson introduced the speaker, Mr. J. S. Peters, of the Westinghouse Electric & Manufacturing Co., Pittsburg, Pa., to address the meeting on the subject "220,000 volt transmission."

Mr. Peters briefly traced the increase of voltage with the progress of electrical development since 1890 showing, by a graphic chart, that the logical point for transmission to have reached by 1923 would be 220,000 volts. He pointed out that at such a voltage the use of a solidly grounded neutral seemed imperative. He described the type of transformer which appeared most practicable for this class of service as having three windings. The primaries and secondaries would usually form a star-star connecton, while the third winding, which might be of any convenient voltage, served the double purpose of enabling a delta to be formed for stabilizing the star point, and of furnishing a circuit to which a condenser might be attached at the receiving end of the line. Single phase transformers were more practicable than three phase.

Detailed information was given as to corona, line losses, voltage regulation, the effect of ground wires, graded insulators and guard rings. The desirability of lightning arresters on 220 kilo-volt circuits was questionable. On account of the great clearances required, it was usually desirable to instal as much as possible of the equipment out of doors.

The lecture was illustrated by a generous showing of charts, diagrams and lantern slides, and was discussed from many angles by Messrs. Hart, Stevenson, H. W. Price, Dwight, Wells, C. W. Baker, Publow, Powell, Chubbuck, Cook, E. M. Wood, S. E. M. Henderson, E. W. Henderson and Borden.

The session was closed by a vote of thanks to Mr. Peters and to the Canadian Westinghouse Company, after which refreshments were served. About 50 members from Toronto were present, many of these having taken advantage of the motor-bus service which had been arranged by the Section for the occasion.

Power Factor

Mr. H. W. Price, associate professor of Electrical Engineering, Toronto University, addressed the meeting on the subject of the "Power Factor" at the meeting of April 7th.

Professor Price had set up, on the lecture table, a very complete outfit for demonstrating the significance of power-factor on alternating current systems. This consisted in a system of loads including inductive circuits, condensers and pure resistance banks, which could be fed from an alternating source either individually or collectively. The load current passed through two sets of wattmeters, one connected to read power and the other to read re-active volt-amperes, and also through ammeters, individual and totalizing. In addition to these there were included in the circuit a direct current voltmeter and ammeter, fed from the alternating current system through an asynchronous commutator, whereby the frequency of the circuit was apparently reduced to about three cycles per minute, enabling the relative fluctuations of voltage and current to be visually observed.

With this apparatus, the speaker demonstrated with great clearness the relative phase position of current and voltage in the several types of circuits, and their effect upon the total current and power in the line. It was possible to make very plain the wasteful effect of low power factors, and to show how the lagging currents taken by unloaded transformers and other inductive apparatus could be neutralized by suitable condensers, with a consequent reduction of line current to a value representative of the energy component only of the load.

In conclusion, Professor Price demonstrated the effect of distorted current waves upon the system, showing that the harmonics which produced distortion were without effect on instruments of the wattmeter type, so that while a wattmeter connected to such a circuit continued to indicate the true power in that circuit, an instrument supplied with a quadrature voltage to give re-active volt-amperes, failed to give the true value, and entirely neglected those harmonics in the current wave which did not appear in the voltage wave. The speaker showed by a simple calculation, that the error so introduced in measurement on circuits of such wave forms as are found in practice might usually be neglected without serious results.

Mr. C. E. Schwenger of the Toronto Hydro Electric System opened the discussion and showed some interesting figures bearing on the cost of transformer magnetizing current in power purchased on a demand basis. It was brought out that it was frequently a better economic proposition to purchase transformers with comparatively large losses, and low magnetizing current, than to make efficiency the sole criterion by which they should be selected. He showed also that in districts where power was comparatively expensive, it would be wise to pay more money for the sake of obtaining transformers and other inductive apparatus having a low value of magnetizing current. Mr. Schwenger's statements were supplemented by Mr. C. W. Baker of the Packard Electric Company, who gave illuminating figures of the ratio between the magnetizing current and the cost of transformers. Messrs. Don Carlos and Borden also took part in the discussion.

Officers for 1922-23

The annual meeting and election of officers of the Toronto section of the American Institute of Electrical Engineers took place at the Chemistry and Mining Building, University of Toronto, April 21. The reports presented, showing the result of activities during the past year, were regarded as very satisfactory and were adopted without comment. The slate of officers that had been recommended by the nominating committee was accepted as follows: S. E. M. Henderson, chairman; D. B. Fleming, secretary. Executive Committee: W. L. Amos, O. V. Anderson, L. B. Chubbock, C. H. Hopper, S. L. B. Lines and C. E. Schwenger.

Prof. A. P. Coleman, of the University of Toronto, gave an interesting address, illustrated by some very fine slides of "Rocky Mountain Trails to Mount Robson."

Radio Forest Patrol

If present plans mature, two radio stations will be installed this season for the use of the forest aeroplane patrols at Norway House and Victoria Beach, was announced by Maj. B. D. Hobbs of Winnipeg Station of the Canadian Air Board. The outfits will be able to transmit by key only and to receive key or phone calls. "The advantages of this method," said Maj. Hobbs, "will be that speedy communication may be made between bases in the matter of reporting fires to the district inspector of forestry, at Winnipeg, so that help may be sent to the scene of fires with the least possible delay, and for the broadcasting of reliable weather reports from the northern country."

Re Standard Electrical Rules and Regulations Governing all Canada

Winnipeg, April 12, 1922.

Editor Electrical News,—

I am very pleased to learn by your editorial of the 1st inst. that this long deferred matter has at last received in some degree the attention that its importance deserves.

A special sub-committee of the Canadian Engineering Standards Association held a meeting on this matter in Toronto on September 8, 1920, at which I had the honor to present the views of a considerable number of inspecting interests in Canada from coast to coast outside the Province of Ontario, including representatives of the two transcontinental railway systems and the Western Canada Fire Underwriters' Association. These interests were uniformly of the opinion that the present National Electrical Code, being the universally accepted Code for the whole of Canada, with the exception of the Province of Ontario, should be accepted as the standard Code for Canada.

There has been, previous to this, a feeling prevalent in certain quarters of Canada that the National Electrical Code was a document of foreign origin and that it was derogatory to Canadians to work under it. Of course this contention is not correct as the N.F.P.A. (which may rightly be considered an international organization) has upon its committees a considerable number of Canadians, but in order to allay this feeling, the chief officials of the Association have expressed themselves as being perfectly ready to arrange for further representation of Canadians on the committees and also to loan to a responsible body in Canada the plates from which the Code is printed and to allow Canada to choose its own title—all this in order to avoid setting up what might be considered a Code varying from the present National Electrical Code.

Of course, it may be argued that the National Code is only a fire code and does not take into consideration the question of the life risk. While this was partly true at one time, this Code is gradually taking in life risk matters, and there is no doubt that in a reasonable time it will deal with this issue to a still larger extent. In the meantime, however, there is nothing to prevent a Canadian organization formulating a concise safety code dealing with the life risk and publishing this, leaving it optional as to whether it should be adopted by the various organizations dealing with such matters or not. The two codes could be adopted separately or together. Of course, we in Canada are governed to a greater degree by municipal inspection than is the case in the United States where a very considerable portion of the inspection work is performed by fire insurance interests, therefore a municipal inspector is bound to recognize the life risk and deal with it. This very fact has brought about many of the difficulties that your editorial touched upon, and until these safety to life views are standardized, this difficulty will continue to present itself and variations in rulings will naturally increase.

Yours truly,
F. A. Cambridge
City Electrician

Revision of the Custom's Classification of Electrical Apparatus

Mr. R. H. Coats, chief statistician for the Dominion Government, has announced a revision of the Customs statistical classification of electrical apparatus and equipment, which became effective on April 1, this year. Mr. Coats' attitude has been entirely sympathetic toward the requests that have been made to him from time to time by the electrical industry to further segregate the various items of electrical apparatus and materials imported into Canada, with the result that the present classification represents a considerable extension over previous years. Mr. Coats is also good enough to say that during the present year proper care will be taken by the authorities at Ottawa to see that other electrical apparatus which is still classified under the "not otherwise provided" heading, will be closely checked and that the principal items under this classification will be picked out, and those found to be of sufficient importance and volume will next year be lifted from the "N. O. P." list and enumerated separately.

Now that Mr. Coats has shown his interest in the electrical industry by meeting us at least half way, it is surely the least we can do to co-operate with him in every way, to the end that returns may be made as promptly, definitely and intelligently as possible. For the benefit of our readers who have not yet seen an extract of this official classification, but who may wish to make a preliminary study of it, we print the items below:

Customs Statistical Classification—Imports.— Effective April 1st, 1922.

Poles, telegraph and telephone	No.
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled or not, 4 inches or less in diameter, n.o.p.	$
Wire rope, stranded or twisted wire, clothes lines, picture or other twisted wire, and wire cables, n.o.p.	$
Wire of iron and steel, all kinds, n.o.p.	Lb.
Electric vacuum cleaners	No.
Washing machines, domestic	No.
Cyclometers, pedometers and speedometers	$
Dental engines, electric	No.
Steam shovels & electric shovels	No.
Switches, frogs, crossings and intersections for railways	$
Wire, plain, brass	Lb.
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires, electric wires and electric cables, for use only in the manufacture of such articles in their own factories	Cwt.
Copper wire, single or several, covered with cotton, linen, silk, rubber or other material, including cable so covered	$
Copper wire, plain, tinned or plated	Lb.
Time recorders and parts	$
Electric batteries, primary	$
Electric batteries, storage	No.
Electric heating and cooking apparatus	$
Electric dynamos and generators	$
Electric fans	No.
Electric fuses, fuse plugs and cutouts	$
Lamps, electric, arc	$
Lamps, electric, incandescent bulbs	No.
Electric light fixtures or parts thereof, of metal	$
Lightning arresters, choke coils, reactors and other protective devices	$
Electric meters	$
Electric motors	$
Rheostats, controllers and other starting & controlling devices	$
Self-contained lighting outfits	$
Sockets, outlets & receptacles	$
Spark plugs, magnetos & other ignition apparatus	$
Switches, switchboards, circuit breakers and parts	$
Telegraph instruments, including wireless apparatus	$
Telephone instruments	$
Transformers	$
Electric apparatus, n.o.p.	$
Bells & gongs, n.o.p.	$
Wire of all kinds, n.o.p.	$
Drain pipes, sewer pipes & earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed	$
Electric light carbons & carbon points, of all kinds, n.o.p.	$
Insulators, electric	$
Shades, lamp, n.o.p.	$

The Problems of the Industrial Engineer

A Series of Short Articles on the Everyday Questions That Arise—The First Article Entitled "A Morning With the General Manager"

By GEO. L. MACLEAN, E.E.
Electrical Engineer Canadian Connecticut Cotton Mills Ltd., Sherbrooke, Que.

[The industrial engineer has problems of his own, often entirely different from those of the central station engineer. In a word, one is dealing with the economical manufacture of electricity, the other with its economical application. One is selling, the other is buying; and so their problems are related to one another in much the same way as are the problems of any other buyer and seller who must bargain together.

All too rarely is the electrical industry inclined to view matters from the industrial engineer's point of view. This, doubtless, is because we have under-estimated the importance of the position he occupies. Today he is not only responsible for the utilization of a very large percentage of the electrical energy generated, but he is also a heavy purchaser of equipment.

A problem very keenly affecting any industry that is operated electrically is the power-factor of the load. Many central stations penalize the consumer for low power-factor; it, therefore, becomes the industrial engineer's constant pursuit to maintain the power-factor of his load above the penalty point. This is not easy to do. Nor is it always easy to convince the management of the necessity of doing it, and of making the necessary outlay of capital to ensure a better power-factor.

We have been fortunate in obtaining the consent of the electrical engineer of the Canadian-Connecticut Cotton Mills, Ltd., Mr. Geo. L. MacLean, to write us a series of short articles, in a conversational strain, telling our readers some of his problems and how they are handled in his organization. The first article is printed below and deals in a general way, with this question. This first article is entitled " A Morning with the General Manager." It will be followed by others dealing more specifically with various operating problems in Mr. MacLean's work—Editor.]

A Morning With the General Manager

The G. M. came into his office one morning feeling a bit ill-tempered and desirous of an excuse to jack up someone. While looking over some bills that were O.K.'d for payment, he came across the power company's bill for the previous month with the electrical engineer's O.K. at the bottom. After looking over the bill and doing a little figuring he came to the conclusion that all was not well on the Potomac and that his appetite for trouble was to be satisfied.

He called the engineer into his office, but, fortunately for the engineer, he had been there before and was therefore prepared for almost any kind of an argument. After a very curt "Good-morning, have a seat", the G. M. handed him the last month's power bill. "Read it over" said he, "and tell us what is the meaning of this." The engineer read as follows:—

Present reading 1,000
Previous reading 500
Kw.h. consumed 500 x 10 x 200 = 1,000,000 kw h.
Corrected to 85% P.F. = 1,000,000 x (85 ÷ 75) = 1,133,333 kw.h.
1,133,333 x 6 mills = $6,799.99

"Why, what's the matter?" enquired the engineer "The figures are O.K. and we used the power." "I understand that all right, but why add that 13 1/3%, why multiply by 85 and divide by 75? Don't we pay enough for the electrical end of this outfit without increasing our power bill to suit the power company? Our electrical department costs more in proportion than any department here, besides being non-productive." This riled the engineer, who answered, "Not by any means. Your electrical department carries as much responsibility as any department in the plant. It is that department which keeps up your repairs and keeps the wheels turning. Summing it up, you are keeping your electrical department to maintain the electrical equipment and keep your plant running. In other words, it acts as an active insurance policy.

"Now I will try to explain why you pay 85/75 of your power consumption. 85 is a figure agreed upon between the power company and the consumer as unity. 75% is the power-factor of your plant." "That means nothing to me", said the G. M. "You are going a long way around to tell me something or nothing." "That may be as you see it", replied the engineer, "but, on the other hand, if I should start using technical terms of electricity with which you are not familiar, you will be farther from understading the why of this question when I am through explaining than you are at the present time, so please let me explain in a way which I am sure you will easily understand. 75% is the power-factor found to exist at our plant here." "Average power-factor?" "No, there is no such thing as average power-factor. Power-factor is a ratio; an average is a quantity; but the power company takes a test once a month and we mutually agree to abide by that test to give us our period power-factor for the month. It would take up too much of your time for me to explain why we cannot arrive at an average power-factor, and why the method we use is the best.

"Let us look at the power-factor of our plant in the light of the following illustration. Two men are pushing a truck A, the men being represented by B and C.

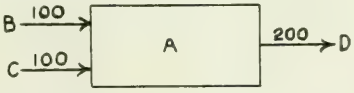


Fig. 1

B exerts a force of 100 pounds, C the same, the resultant of these two forces acting in the direction of D is 200 pounds. This is 100% power-factor. But suppose some obstacle causes C to move away from B as shown in figure 2. If C moves away 30 degrees away from B then the resultant of the combined forces of B and C is 200 x .9659 (which is the cosine of half the angle of 30 degrees) or 193 pounds. We arrive at this figure by using the rule that the resultant of two forces at angles to each other is the sum of the two forces multiplied by the cosine of half the angle.

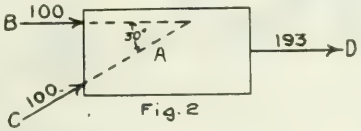


Fig. 2

"In Fig. 1 we have our voltage and current both working together, but in Fig. 2 we have put in the way of

C, which we will use to represent voltage, an obstacle called reactance, this being due to many small motors in our plant and underloaded large motors, so that C cannot push as much as B. The reason why we pay the difference between 75 and 85 is that in order for the power to reach our motors and supply the right amount of energy, the power company has to impress enough power on the line to overcome this obstacle we have imposed upon them.

"This point may also be illustrated in another way. Suppose we buy water at 110 pounds pressure and we send back pressure of 10 pounds, the water will then have to be raised to 120 in order for us to receive 110 pounds, so we have to pay for this extra 10 pounds back pressure we are imposing."

The G. M. had been following this explanation very closely and said, "Well, I guess I see it more clearly now. We cannot expect the power company to give us power when it is their business to make it for sale. But, just a minute, why do they multiply by 200?" The engineer replied, "We are using a 500 volt 5 ampere meter and in connection have to use 1,000 ampere current transformers. In this way only 1/200 part of the actual current flows through the meter." "Is there no way to correct this power-factor condition?" enquired the G. M. "Yes, there is, but as many conditions must be considered, there is hardly time this morning to take up that question."

As he left the office, the G. M. thanked the engineer for his explanation and handed him a cigar.

Price of Copper at About Lowest Point in History

A most interesting review of the production and the maximum and minimum price of copper from the year 1860 to the present time is made by the Associated General Contractors of America, in a recent publication. The information is also shown graphically. It is noticeable that the price of copper, at the moment, is at almost the lowest ebb in its history. Note, also, that the reduction in price from the high point of 1917 is more drastic than almost any other product entering into our industrial life. At the present time, copper is shown to be slightly lower than before the war, and to those who are in the market this curve would seem to indicate that the present time is opportune for purchasing. The price curve indicates, in a general way, that from 1860 to about 1896 the tendency was slightly downwards, but that from 1896 to the present time the tendency is slightly upwards.

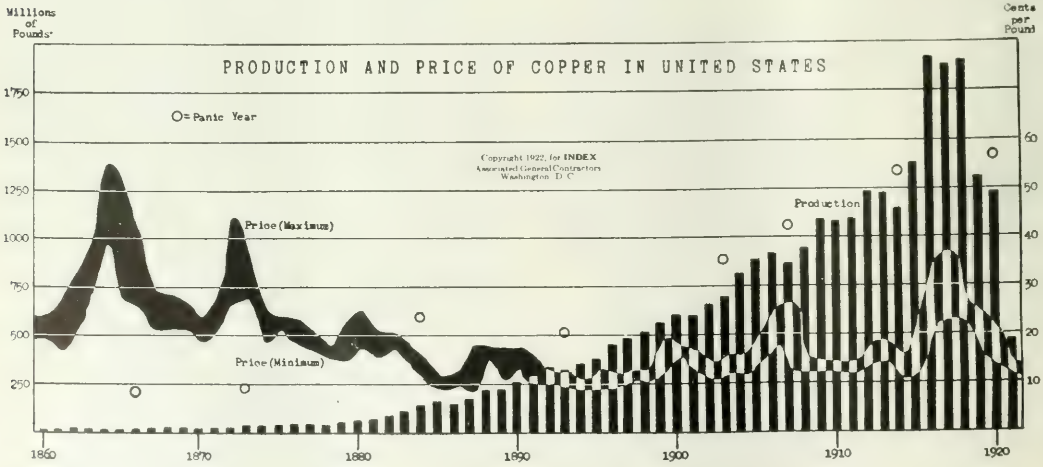
The columns also indicate in a very interesting way the production of copper over the same period. Up to about 1880 copper had not attained any great prominence in the commercial world. The increased activity at that time plainly coincides with the birth of the electrical industry. During the following 35 years, as the electrical industry developed the demand for copper increased enormously. The falling off since 1918 is, doubtless, accounted for very largely by the fact that the electrical industry had overbuilt in the tremendous effort it had made during the war. In the last three years the production of copper has been marking time, so to speak, until the demand should catch up with the over capacity for supply.

We understand that already a noticeable increase in production has taken place, which is noteworthy as being one of the indications that the post-war readjustment, at least as regards this article, is pretty well completed.

The Possibility and Practicability of Milton-Volt Transmission

By C. C. CHESNEY

As is well known to electrical engineers, the principal factor limiting the maximum value of voltages for transmission purposes was that of line iinsulation. The transformer designer and builder was ever in advance of the line constructor. This is possibly due to some extent to a less difficult problem, but was principally due to the better facilities of the transformer designer to obtain at less expense by experimentation, practical working data on which to base his designs. Two hundred and fifty thousand volt transformers of substantial size have been available for experimental purposes for the past 15 years. About 10 years ago, Mr. F. W. Peek, based on data obtained from 250,000 volt tests, established certain laws governing visual corono and corona losses on transmission lines. These laws were believed to hold good for much higher voltages than then experimentally determined. During 1921, transformers and other apparatus had been designed and built for transmission plants requiring 220,000 volts. It was, therefore, now important to know if the laws



experimentally determined at 250,000 volts would hold at much higher voltages. The purpose then, of 1,000,000 volt experiments carried on in Pittsfield during the past summer was to determine:

1. If the spark-over curves which were determined experimentally up to and including 500,000 volts, held for higher voltages.

2. If the laws developed from data obtained from 250,000 volt tests governing visual corona and corona losses on transmission lines held for voltages up to and including 1,000,000 volts.

3. To check the line insulator spark-over curve for the standard insulators and to extend it to cover the higher voltages.

The tests were made in the high tension engineering laboratory of the Pittsfield works, and were under the direct supervision of F. W. Peek, Jr.

The million volt tests were made at 60 cycles; electromotive force wave generated by the generator was approximately a sine wave. Transformers were 1,000 kv.a. in capacity and of the standard type. Our engineers estimate that the maximum error at the very high voltages in these results is not over five per cent. Tests were made on the typical electrodes that occur on transmission lines and otherwise in practice. The needle gap requires a minimum voltage for spark-over for any given sparking distance. This was well known and is due to the non-uniform field caused by the point electrodes. The sphere gap on the other hand represents as nearly uniform field as generally occurs in practice, and requires a maximum spark-over voltage for a given spacing or gap.

Visual corona tests were made on one inch, one and three-quarter inch, and three and one-half inch diameter parallel brass tube at various spacing. These tests show that the corona starting point for these very high voltages can be calculated from the laws established at the lower voltages.

The line insulator spark-over curve was found to be continuous at the high voltage.

The first 220,000 volt transformer built for transmission purposes, was built for the Big Creek Power Company, California, and has been in operation on the lines of this company for two months at 150,000 volts.

Assuming that the industrial and economical conditions would warrant the building of a million volt transmission line, these conditions are of course, extremely problematical. First, the low voltage power house would present no particular complication except that it must have the ability to handle, regulate and control the large amount of energy necessary to make such a line economical. The transformer does not offer any great diffuculty in design and construction, and the design would probably be along the line of present-day practice. The bushing is probably the most difficult part of the transformer.

Third, the conductor as determined by Messrs. Faccioli and Peek, for a critical voltage of a million volts would be five inches in diameter for a minimum corona loss. Allowing for a ten per cent fluctuation of line voltage the conductor should be six and one-half inches in diameter; conductor would be hollow tube or some equivalent construction.

Four, the line insulator as has always been the case, presents the great difficulty, and from our tests should be 15 feet to 20 feet in length. From this data, therefore, you have a rough picture of the line. A six and one-half inch hollow conductor suspended by insulators 20 feet in length, and conductors spaced at least 20 feet apart. This is not an impossible engineering proposition and I am inclined to believe that it is no more formidable than the 100,000 volt line appeared to be to the electrical engineers of twenty-five years ago. I believe that the limitations are more mechanical than electical.

Everybody "Listening In"

British Columbia has gone in for radiophony with true western thoroughness. In the language of a once popular, now almost forgotten rag-time melody, everybody is radiophoning now. The daily newspapers are giving publicity to the idea, which was needful to get the people into the habit of "listening in." Each of the three Vancouver dailies installed radiophone service and are now giving it a great deal of front page prominence. Attractive radiophone service programmes are billed each day and evening and sent out by each of the dailies from powerful central transmission stations. The programmes include a news bulletin of world and local daily events, short addresses from public men on important questions, and a varied musical programme. The daily papers have not only furnished lavish instructions as to how to share in the enjoyment of the radiophone service, but have as well urged their readers to install the necessary apparatus. In addition to that, reports from those having sets installed are asked for and published daily, showing the wide diffusion of the new service and the thorough practicability of this means of "broadcasting" news.

So popular have the "radiophone parties" become in the coast city, that there is a rush for placing orders to have sets installed and the necessary wiring put in houses. Hundreds of radiophone sets of all sizes and capacity from those with a 15-mile radius up to the powerful set which can catch the waves generated five hundred or a thousand miles away, are now on order and many of them are being rushed forward by express from the manufacturers in eastern centres. People are coming into the contractor-dealers urging them to accept deposits on sets, in the hope of securing priority in having them installed. Naturally the electrical men are up on their toes to meet the demand and to take care of it. As one prominent contractor said: "This is the biggest thing that has happened in electrical circles for many a day. The industry has had something coming to it for a long time, which promised them a volume of business showing a reasonable profit. This wireless telephone development has furnished us our opportunity and it is up to us to take hold of it. My only hope is that the industry, through the manufacturers, can prevent it being "departmental-storeized" or from falling into the hands of, say, the music trade, like the gramophone and the phonograph.

"The experience of cities in the eastern U. S. has already shown us the way, and as there is not the least question of the practicability of the system, all that remains for the electrical industry is to become thoroughly posted on all the latest appliances and methods, secure stocks promptly, and then go out after the trade that is now clamoring for wireless phones. There is not a home but will be a possible customer," said this contractor, "just as the gramophone and the phonograph went into the homes of the people."

Inquiry showed that for a set with fifteen mile radius—about the simplest form of wireless in use—the price is about $25. while for a set with 500 mile radius the price is about $110. The contractors are quoting for installation somewhat as follows:

Aerial, on top of ordinary dwelling	$10.00
For each outlet installed, including socket	5.00

These prices cover necessary wiring, and as the installation is all in multiple, but one pair of wires is necessary, even though outlets are installed in several rooms in a house.

More Generators for Queenston-Chippawa Hydro-Electric Development

Generator No. 1 was Described in our issue of April 1. No. 2, operating, and No. 3, being erected, are Identical with No. 1. In the Article below we describe Nos. 4 & 5

Generators No. 4 and 5 which are being supplied by the Canadian General Electric Company, have been built at their Peterboro factory. They are 3 phase machines, each rated 16 pole, 45,000 kv.a., 187½ r.p.m., 12,000 volts, at a power-factor of 80%, current lagging. They are of the vertical shaft, revolving field type, with spring thrust bearing, upper and lower guide bearings, and with direct connected exciter.

Each generator is capable of carrying any momentary overloads to which it may be subjected, and is also mechanically capable of delivering the rated capacity of its turbine, namely 52,500 H.P. The normal speed is 187½ r.p.m., with a frequency of 25 cycles per second, and is designed for a run away speed of 347 r.p.m. It is designed to deliver its rated capacity at a normal potential of 12,000 volts, but provision is also made for carrying its rated full load amperes at any voltage up to 13,200, and it will operate under these conditions for several hours without exceeding a safe temperature limit.

The machines will operate continuously at rated load and power-factor, with an observable temperature rise not exceeding 65 degs. C. by embedded detectors. The units will meet the usual requirements with regard to wave form and parallel operation.

Each generator has been designed to withstand dead short circuits at normal voltage at the armature terminals. The leakage reactance drop with full current is 18% of the normal terminal voltage.

The efficiency of each generator at 45,000 kv.a., 80% p.f., 75 Deg. C., will not be less than 96.87%, and at 100% p. f., not less than 97.72%. These figures include all losses, including exciter losses.

For cooling purposes, free air at not more than 40 deg. C. is supplied. The temperature rise of the air in passing through the generator, when operating at rated load, is approximately 20 degs. C. The cooling air is taken into the generator at the bottom, and expelled through openings in the side of the stator frame. Openings are provided in the rotor spider rim between the sections, to allow air to pass through the space between the poles. A suitable blower is provided for exhausting the air from the chamber surrounding the stator, at a pressure equivalent to 2 in. of water.

The Exciter

The direct connected exciter is an 8-pole, 150 kw., 187½ r.p.m., 250 volt, commutating pole machine, and has sufficient capacity for exciting the generator, when carrying a load of 45,000 kv.a., at 80% p.f., 13,200 volts.

The weights of the various parts of the generator are approximately :—

Rotor Total	600,000 lbs.
Stator complete	350,000
Base, Lower Bearing Bracket, upper Bearing Bracket, Platforms, Bearings, Bearing Housings, Thrust Collar and Exciter	250,000
Approximately	1,200,000 lbs.

The height of the machine from the bottom of the base to the top of the exciter bearing bracket is 28 feet 3 inches, and from the coupling face to the top of the exciter bearing bracket 33 feet 10 inches. The whole of this height does not project above the generator room floor. The height above this floor line is 13 feet 7 inches. This means that the whole of the generator stator is below the main power house floor line. The outside diameter of the stator is 24 feet 8 inches.

The Stator

The stator, which is made in three (3) sections, has a series of radial ribs, and dovetails on the inner surface of these ribs are provided for receiving dovetail keys, on which the punchings are assembled. The punchings are built up in this vertical frame, with ventilating ducts at frequent intervals. A projecting ledge at the bottom of the armature frame is provided, which supports the armature end plates on which the punchings are built. On the top of the punchings another end plate is clamped down to hold the punchings tight. The stator frame is bolted to the base, and provision is made for jacking the frame horizontally in all directions when setting up. The top end of the frame supports the bearing spider. The top bearing bracket is concentrically held in the frame and adjusts horizontally with it.

The Rotor

The rotor is built up of seven (7) high grade cast steel spiders mounted on the shaft, one above the other, with their hubs contiguous. The spiders are mounted on the shaft with a press fit. A shoulder on the shaft below the spiders aligns them at the proper height. In addition to the friction of the shaft fit, heavy bolts extend through the hubs of all the spiders, holding them together. Ventilation holes between the sections are provided. On the outer periphery of the spider rims, dovetails for the poles are provided, and these slots are continuous from top to bottom.

The poles are built up of laminated sheets of steel with cast steel end plates, and the punchings are clamped by rivets runing from one end plate to the other.

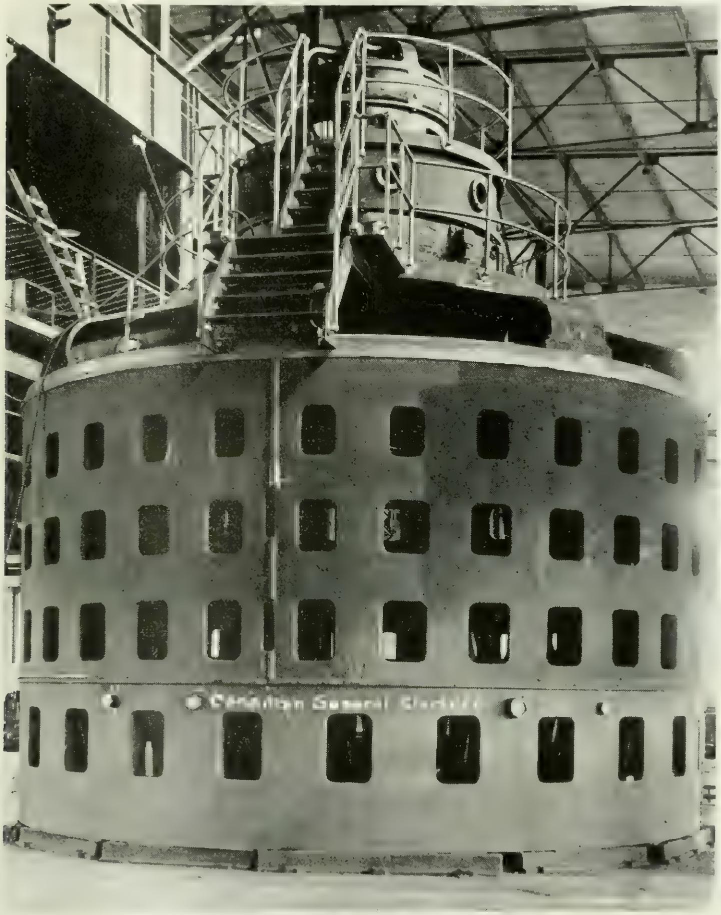
The field coils are all of strip copper wound on edge, and are placed over the pole pieces, after the latter have been insulated, and before the poles are mounted in the dovetails in the rim. Heavy insulating collars are mounted at the ends of the coils.

The lower guide bearing bracket, which is of cast steel, is supported from the inside of the base. Both this bracket adjustment, and the spider adjustment, are preserved by dowel pins.

The armature coils are of the diamond type of coil, with two legs per slot. The leads are brought from the upper end of the coil where the connections between the coils are made. The coils are insulated with several thickness of mica between the turns and also on the outside. This mica is applied under the most approved processes which have been developed by this company. The coils are held in the slots by wooden wedges, and horn fibre casing is provided for mechanical protection. On the projecting end of the coil beyond the punchings, provision for tying the coil ends against strains and short circuits has been made.

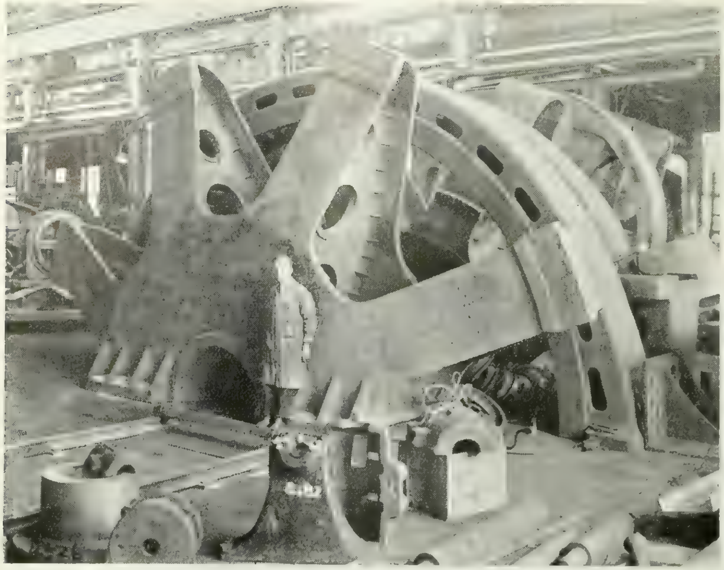
Bearings

The generators are equipped with spring thrust bearings. The latter are so designed as to carry the weight of the revolving portions of the generator, exciter and thrust bearing and the unbalanced downward thrust of the turbine, under all starting, running and stopping conditions met with in operation. The bearing is capable of sustaining and operating under a total combined weight placed on the bearing of approximately 1,000,000 lbs.



As Generators No's 4 and 5 will appear when installed

The spring supported thrust bearing as used in these generators, and in other generators built by this company and other companies, has been developed in an effort to overcome certain difficulties experienced with other types of bearings. Of the many types in the market, the spring supported thrust is the only one which automatically adjusts itself, while in actual operation, if there is any loss of alignment due to settling of the foundations or other causes. The rubbing surfaces are in a bath of oil, and the quantity of oil circulating from the outside source, depends on the losses and the cooling conditions. The pressure under operating conditions is within the standard allowance for these bearings of 300--400 lbs. per square inch. Copper water cooling coils are installed in the bearing housing, in order to cool the lubricating oil, thus reducing the amount of circulating oil to the minimum required to provide clean oil for the bearing. These cooling coils were given a hydrostatic pressure test. The thrust collar of the bearing is keyed to the shaft, and transmits the weight of the revolving parts to the rotating ring of the bearing. This rotating ring has a smooth rubbing surface and is so designed that a rapid circulation of oil is maintained. The stationary ring rests on springs and to insure flexibility it is made thin and has a radial saw-cut through one side. The upper surface of this ring is the stationary rubbing surface of the bearing. Sufficient springs are provided, so that the stress is only about one-half of that generally used, and the deflection under load is only about .1 of an inch. They are held in position by means of centre pins. They have been so designed that they are not stressed beyond 40% of the elastic limit of the steel. An oil well tube is provided around the shaft, which forms the inside annular wall of the oil cham-



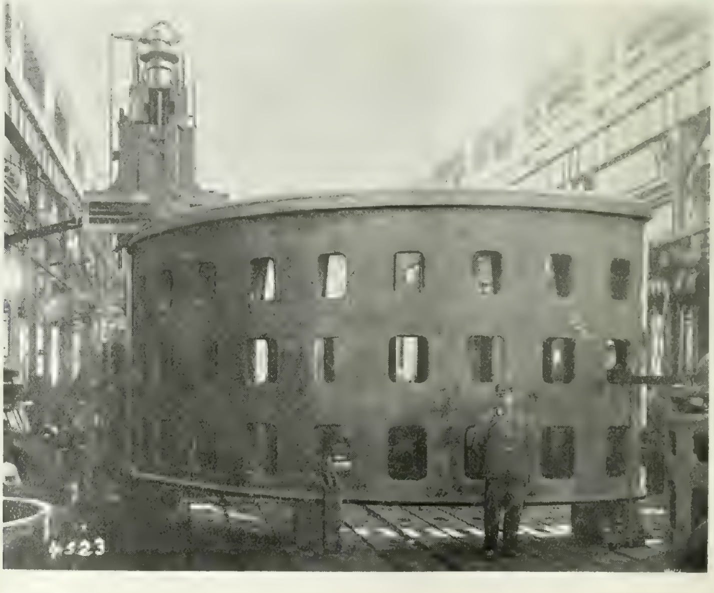
One half of top Bearing Bracket in generators 4 and 5 Queenston-Chippawa Power Development.

ber, and is welded to its supporting ring. Dowel pins are provided to keep the stationary ring from revolving. For cooling purposes, water at about 25 degs. C. is circulated through the cooling coils. When water cooling is used, 5 gallons of oil per minute are supplied to the thrust bearing, and as an additional precaution, arrangements are made to filter the oil, and cool it before recirculation. A recording thermometer is supplied, with a bulb located near the bearing in the oil.

The lower guide bearing shell is split to facilitate dismantling, and is supported in a removable spider. The opening in the lower guide bearing spider is large enough to allow the coupling on the shaft to pass through. The upper guide bearings are lined with babbitt. The usual oil deflectors are attached to the shaft to prevent oil leaking down the shaft. The drip oil from each bearing is caught in a cast iron drip pan attached to the bearing supports, from which the oil is drained by gravity. Each bearing has an independent oil feed pipe.

The Shaft

The shaft is a hollow steel forging, with forged half-coupling, 30 feet 2¾ inches overall in length with a maxi-



Section of Stator Casting, generators 4 and 5. Queenston-Chippawa Power Development.

mum diameter of 32 inches. A cylindrical hole, 8 in. diameter, extends the entire length of the shaft. A suitable groove is turned in the part of the shaft above the rotor spider, for attaching the lifting device, to enable the complete rotor to be handled by the cranes. Shroudings are provided on the coupling to cover the coupling bolt heads and to prevent accidental contact with the projecting parts.

In order to investigate the temperature in the windings of the generator, copper constantan thermocouples are provided, which are placed either between the upper and lower coils or in the bottom of their respective slots. The connections are made by copper constantan duplex wire, as far as the cold junction box; from there to the recording instrument and the indicating instrument on the panel, the connections are duplex copper wire. The indicating equipment is a special design for this particular plant and is very complete with indicating lamps and alarm contacts, besides the instruments mentioned above.

Armature Coil, generators 4 and 5, Queenston-Chippawa Power Development

With each generator is furnished a Tirrill voltage regulator, complete with line drop compensator.

In assembling the unit the waterwheel casing is put in place and then grouted in. The foundations for the generator are then built up to the required height, for the assembling of the generator base. The generator proper is in a pit. Four air inlets lead from an air supply duct through the concrete foundations to an inlet chamber underneath the generator. The air then passes through the generator into the concrete pit in which the machine is placed; from there it is collected by means of a fan, and passed into the exhaust chamber and thence into the exhaust duct.

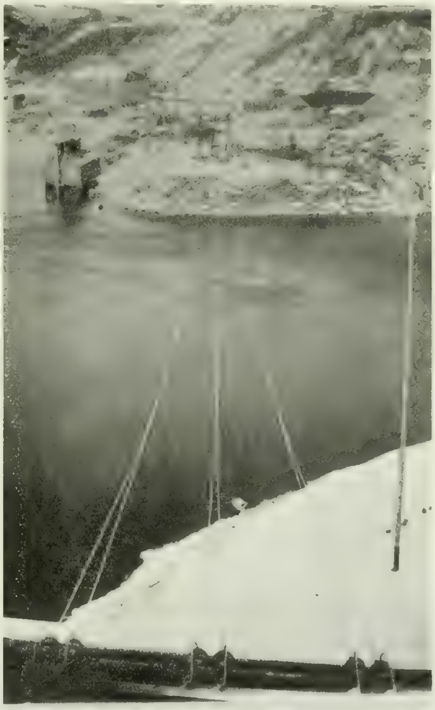
Truss Arrangement of Long Span

By C. R. REID

Power House Superintendent, Shawinigan Water & Power Co

The writer has recently had occasion to make some observations on a transmission line span which has some unusual features. This span is 435 feet between supports and is composed of six 500,000 circular mil aluminum conductors, two per phase. The conductors are spaced horizontally one foot between the two conductors of each phase and five feet between the conductors of different phases.

The circuit of which this span is a part, is transmitting 19,.000 kw. at 6,600 volts, with a current per phase of approximately 1,600 amps. The magnetic flux set up by this current draws the two conductors of each phaze together in the central part of the span as can be observed in the photographs. This results in a sort of truss arrangement of the two conductors, which has a marked effect in cutting down oscillation caused by wind. When the power is off the line and the conductors fall apart, the oscillation is erratic and of considerable magnitude, if there is a stiff breeze blowing. However, with power on the line, the oscillation is not only greatly reduced but the period of oscillation is considerably extended. The accompanying view from a time exposure made on a fairly windy day will give an idea of the steadying effect of the truss arrangement of the conductors.



The two conductors of each phase are drawn together

It is possible that in certain cases it would be desirable to construct long spans in this truss form in order to secure stability. A convenient arrangement would be to clamp the two conductors together at the middle of the span and also connect them by a jumper near each end.

BETTER MERCHANDISING

Electric Home Exhibition in Vancouver

Demonstrating Every Form of Labor Saving Household Appliance

Demonstrating the electric idea in every form of labor-saving household appliance and convenience, the members of the electrical fraternity in Vancouver at the same time demonstrated to themselves the value of team-work, by their attractive electric home exhibit maintained during the two weeks of the Building and House Furnishing Exhibition from March 11th to 25th, inclusive. It was truly team-work, for every factor in the industry was represented. Central station, manufacturers, jobbers and the Vancouver Association of Electrical Contractors and Dealers united in the effort, which was successful in every way. The cash outlay to the individuals joining in the exhibit was small through the pooling of their resources. The exhibit, artistically arranged and decorated, showed interiors of three rooms, kitchen, dining-rom and bed room. In each, suitable furniture usually found in such rooms in the home, was installed through the courtesy of local manufacturers. Particular care was taken to secure proper illuminating effects and wiring for convenience outlets.

Inasmuch as the B. C. Electric Company, Canadian General Electric Co. Ltd., Canadian Westinghouse Ltd. and Northern Electric Co. Ltd., pooled their interests in this exhibit the appliances used were chosen by lot and all marks of identification on the appliances used were covered with signs which said for example 'Electric Range' rather than some particular make of electric range.

In the kitchen a range, water heater, ventilator fan, dishwasher, electric iron, cake mixer, bell transformer and electric fan were demonstrated. In the dining room a heater, vacuum cleaner, chafing dish, coffee percolator, tea ball, tea pot and electric toaster were demonstrated. In the bedroom a warming pad, milk warmer, vibrator, violet ray, curling iron heater and electric curling iron were demonstrated. In addition to this in the bedroom up-to-date wired furniture was a feature which attracted much attention. Bracket lamps were installed on the mirrors of the dressing table and bureau which matched the finish of the bedroom set.

Each convenience outlet was placarded. Those convenience outlets installed waist high, or higher in the walls had a card directly above the outlet. Signs on the walls with ribbon running to the baseboard outlets explained the use and purpose of each particular outlet installed in the baseboard.

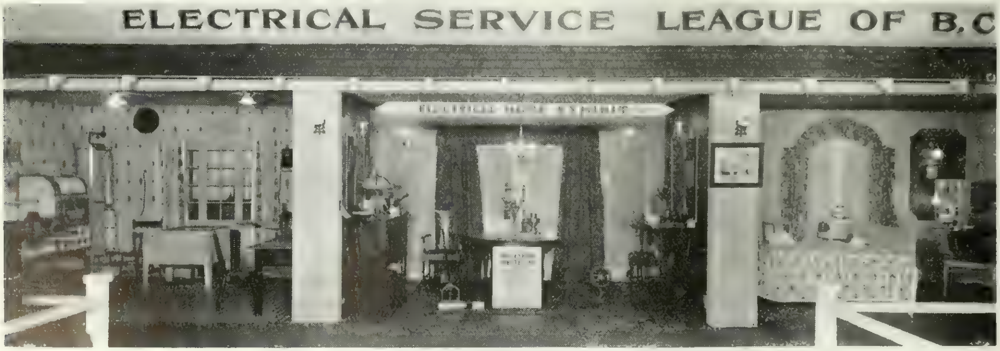
Another feature which attracted considerable attention was the illuminated street number on the outside pillars of the booth.

The cost of operation of each appliance was set forth on small cards placed on or near the appliance in question.

The demonstrators were also handled in a co-operative way. The Show ran from 11 o'clock in the morning until 11 o'clock at night and it was necessary to employ one man who served from 11 o'clock in the morning until 2 o'clock in the afternoon. From 2 o'clock until 11 o'clock at night two shifts of three men each handled the exhibit. The demonstrators were furnished equally by the manufacturers, power company, and contractor dealers represented, so that a competent demonstrator was always available in each room of the exhibit to explain the proper wiring and illumination as well as the use of the appliances.

As a matter of fact the proper wiring for convenience outlets and proper illumination was stressed in the exhibit and the demonstrating of the appliances was merely incidental. As a direct result of the exhibit a local manufacturer of furniture proposes to wire a high grade line of furniture for the use of appliances. This will benefit the industry at large very greatly as this particular firm is the largest furniture manufacturer in the Province. Each piece of wired furniture sold will necessitate the installation of a convenience outlet; and convenience outlets once used in a home, sell themselves.

In addition to this, a large number of 'prospects' for



Electric Home Demonstration in Vancouver put on by Electrical Service League of B C ranges and sundry small appliances, prospects for wiring for convenience outlets and for proper illumination have been obtained.

During the exhibition 10,000 pamphlets were distributed advertising the Service League as an information bureau for the prospective builder or prospective purchaser of any appliances. These pamphlets, in addition to offering the service of the Service League to the public, showed wiring plans for a two-story house based on the plans of the Toronto electrical home, a list of suggested appliances for each room in the house and a sound talk on proper wiring.

The central station is sending an illumination expert to all prospects who asked for information regarding proper illumination This man advises the type of fixture to obtain the desired illumination, but makes no effort to sell fixtures or the wiring necessary to accommodate the proposed change. When a prospect has expressed the desire to purchase fixtures as suggested the name and information is turned over to the contractor dealer who will finish up the job. If the prospect has a contractor dealer with whom he ordinarily does his electrical business, the prospect is turned over to that man, otherwise prospects are turned in in rotation to the members of the Contractor Dealers Association, regard being taken to their equipment, etc., enabling them to handle the prospective job.

Range 'prospects' are pooled and given to the manufacturers all at the same time. Prospects for particular appliances are turned over to the manufacturer furnishing that particular appliance after adequate information has been forwarded to the prospect from the office of the Service League.

The electrical home exhibit attracted more attention than any other single exhibit in the building and in the opinion of the Advisory Council of the Service League was a success in every way. It was particularly good propaganda preceding the erection of the electrical home which is contemplated in the near future.

The Price-Cutting Jobber

By C. D. HENDERSON*

The contractor-dealer to-day is confronted with a serious problem in the question of whom to buy from. The depression which it is to be hoped we have passed through brings the question of business ethics very much to the fore. Naturally some manufacturers and jobbers at a time like this, in their ambition to procure business, will cut below the regular market prices and the dealer is tempted very strongly to favour these concerns with his orders.

The point is—shall the dealer who has been served in a satisfactory manner for years by one or two concerns transfer his business to another jobber simply because he is offered a cut price?

Looking at the matter from a cold blooded standpoint the dealer might say that owing to the fierce competition he is forced to meet it is necessary for him to take advantage of these cut prices because his competitor across the street will likely do so and thereby have an advantage over him.

On the other hand there is no doubt of the obligation the dealer owes to his regular jobber. When times were good and materials hard to procure this jobber no doubt stood by the dealer and gave him preference over the fly-by-night dealer who sent in his orders only when he could not procure the goods elsewhere. Almost any electrical dealer has recollections of the boom years of 1917-18-19 and 20 when at times it was almost impossible to keep an adequate stock and most of us had our favorite jobber who managed in many instances to ship us materials when the market was apparently cleaned of stock. These same jobbers extended other favours to their loyal dealers in a financial way, carrying many of them for months to enable them to complete large contracts when very often financial assistance could not be procured from the banks.

There is another angle to this question which it might be well for us to consider. The dealer who buys goods on a price basis only must realize that he will eventually establish that kind of a reputation among the salesmen calling on him and will thereby lose the helpful advice which they are frequently in a position to give him. They certainly will not go out of their way to offer him any special propositions that may come their way from time to time but will favour their friendly dealers who stick by them through good and bad periods. Furthermore during good times the legitimate jobber will not be anxious for the "close buyer's" trade, realizing that the minute some price cutter comes along he will lose him again.

The problem is a very difficult one and the purpose of this article is not to offer solution but rather to start some thinking as to where to draw the line between business ethics and economic necessity.

Some dealers believing there is such a thing as sentiment in business have put the matter up to their regular jobbers very frankly by stating that while they can buy cheaper from a competing jobber they have no desire to transfer their patronage elsewhere simply on a price basis. They suggest that he sell them a little lower than the market price but still at a figure above the special cut prices. In this way the extra cost above the special cut is borne in part by the seller and in part by the buyer but the jobber retains his regular customer although his profit is cut down and the dealer maintains his reputation for fair dealing and thereby the good will thus created is mutually beneficial. The writer does not advocate this practice becoming general as it in reality sanctions price cutting. I am merely stating that I know of cases where it has bridged a difficulty.

Most of us, whether we are jobbers, manufacturers or dealers realize that price cutting in any shape or form is a curse and apart from the opinion some jobbers may have as to the attitude of the average dealer on the matter I honestly believe that 95 per cent. of the contractor-dealers of this country would gladly welcome a standard price for each and every article they buy, no matter from what jobber or manufacturer it be purchased. Then salesmanship, quality and service would predominate every transaction. The illegitimate jobber would be eliminated and the dealer would save time and money in the long run.

Kilowatt, the Servant

Don't work until you're tired and hot;
Leave it to Mr. Kilowatt.
He'll wash your clothes and clean your floors,
Cook your meals and do your chores.
He never complains and never sleeps.
He doesn't even stop to eat.
For a cent or two he does the lot.
Perfect servant! Kilowatt!

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[*] President Henderson Business Service, Ltd., Canadian Manager A. B. C. Co., Brantford, Ont.

The Jobber Situation

By M. K. PIKE

Sales Manager Northern Electric Co.; President Electric Supply Jobber's Ass'n

What service does the industry require of an electrical jobber and how are the other branches of the industry endeavoring to assist the jobber to provide this service?

This question merits the close attention of everyone interested in the manufacturing, merchandising, operating or contracting field, and justifies a close analysis of our industry as it is organized to-day, to see if the jobber is being allowed to develop as the industry develops, and to learn what is being done to strengthen or to weaken his position.

There can be no argument but that the natural economic movement of electrical supplies is from the manufacturer through the jobber to the contractor-dealer or industrial consumer, and, generally speaking, manufacturers are as ready to admit this as are the jobbers themselves. As a matter of fact the very seriousness of the present day situation is due to the over anxiety on the part of the manufacturers to extend jobbers' privileges to many job-lot jobbers, who do not, never have, and in most cases cannot hope to render a real jobbing service to either the supplier or the customers.

The services expected, in fact demanded, of the jobber to-day are varied, but all are natural functions of a merchandising organization. They include carrying a large and well assorted stock of regular moving lines, some items of which turn over rapidly, others more slowly; selling by salesmen solicitation over a territory adjacent to his warehouse; handling the credits of his customers; distributing suppliers' advertising matter and tieing up with national campaigns; and last but not least, offering a consulting service on the many technical problems that arise in the course of the customer's own work.

In other words, the jobber does for the manufacturer that which the manufacturer would have to do himself were no jobbers in existence. The fact that he does this work for many manufacturers, making their products easy of access to the customers in his territory, plus the technical consulting service he maintains, makes the jobber a most important connecting link in the chain of distribution.

Surely these services can more economically be performed by a well organized jobber, with an established merchandising policy, established credit policy and trained staff of salesmen and specialists, than by the job-lot man who only caters to the buyer with a few ill-assorted lines, and then only to the buyer who is easily reached and who requires little service. Such jobbers are not creating a demand. They render no real economic service to either the supplier or the customer, and are only attempting to skim the cream off such transactions as can be handled by job-lot organizations. They are depriving the industry to-day of that which is so essential to its progress, well organized jobbing facilities—by making it impossible for organized jobbers to operate at a profit and continue to give a real economic service to both the manufacturer and the customer.

The crux of the matter is that if that portion of our business which can be taken care of with only fast moving items in stock, with no real jobbing service and no technical problem to advise on, is to be split up between real jobbers and job-lot jobbers, the jobber must curtail on his expenses. Thereby, the class of business requiring real service, special materials, credit risks, and specialists' services must suffer, and the real jobber must develop into a job-lot jobber, otherwise he cannot hope to meet the type of competition being forced upon him by the manufacturer, who is, to-day, and has been during the past two or three years indiscriminately creating new jobbers from among jobbers' salesmen or from the contractor-dealer class.

It is undoubtedly true that a new jobber added to a manufacturer's list temporarily increases that manufacturer's sales (at least to the extent of his initial stock) but does he, as a rule, create any new demand, and serve to strengthen the chain of economic distribution? He certainly does not unless he is an experienced merchandiser, knowing the service he is expected to render and is prepared to economically perform that service.

But what other effect has this indiscriminate appointing of jobbers had on the old established jobbers other than eliminating a portion of their market? It has had the very serious effect of reducing their gross profit, for the very good reason that not being expected by either the manufacturer or the customer to render the same kind of service as has been expected of the old jobber, the new jobber is satisfied with less spread and the older jobber has been left with his customers who still require a real jobbing service but with not enough spread in his schedules to enable him to render that service.

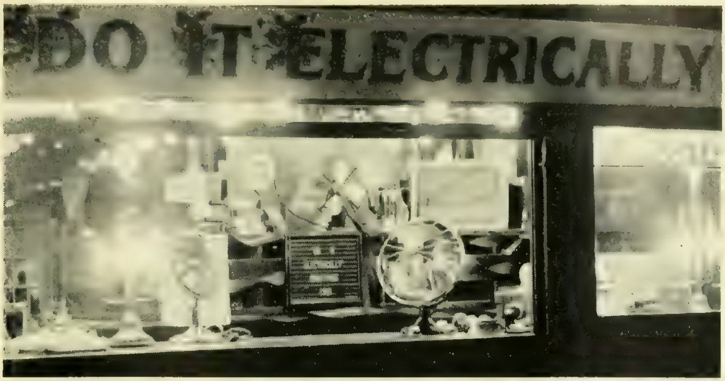
There can be no question but that the jobber of to-day must keep his house in order and improve his merchandising methods if he is to survive. If the industry is to progress, as we all hope to see it, he must be encouraged to render a real service to the industry. He should not have the considerable percentage of his market that does not require the same type of service required by the other portion, taken away from him only to be catered to by one who specializes in a very few fast moving lines, knows nothing about the real service required and cares less, has no established policy and is in business to scalp a profit without rendering an economic service to the industry.

As jobbers, we ask the other branches of the industry to pause a moment and consider that it is your problem as well as our own. We only ask a chance to perform a real service to the industry and believe we have a clearly defined field of operation, and that our existence is dependent upon getting a square deal from these looking upon us to perform a service for them.

Arrangements are being made for a bumper meeting of electrical contractors and dealers in London, Ont., Monday evening, May 22. Mr. V. K. Stalford, who has been acting as organizer for the Ontario Association, has the matter in charge. Contractors and dealers in the cities of London and St. Thomas, and the surrounding district, are urged to make their plans ahead so that they may meet in London on the 22nd and discuss matters of mutual interest, including organization into a District, so as to tie in with the provincial association.

COME TO DEALERS' MEETING IN KITCHENER

A special Dealers' meeting will be held in Kitchener on the evening of May 5. This is the Friday of the Electrical Show week, and dealers throughout Ontario are cordially invited to arrange their plans to be present on that occasion. Mr. K. A. McIntyre will address the meeting.



A Corner of the Dominion Power and Transmission Co's Show Rooms

Popularizing the Electrical Idea in the City of Hamilton

Electrical Development League, Comprising a Small Group of Enthusiastic Merchandisers, Rolling up a Campaign that Reaches It's Objective on May 13 in the opening of an Electrical Home, Built for the Purpose and Equipped as Every Modern Home Should be

The opening of an Electric Home on May 13, in Hamilton, Ont., by the Hamilton Electrical Development League will represent the climax of a campaign which has been gradually increasing in interest for several months.

It was on November 1, 1921, that the Hamilton Electrical Development League was formed, consisting of two representatives from each branch of the different electrical organizations then existing. It includes manufacturers, central station men, contractors, dealers, wholesalers and engineers.

The League was formed for the following purposes and objects :—

"To carry on educative work and by various means to create in the public mind an increased interest in electrical appliances and in the many uses of electricity; to create a realization of the need for proper and adequate wiring so that Electrical Appliances may be used conveniently and an appreciation of the requirements of good illumination.

"To carry on similiar work among architects and builders, and to arouse all members of the electrical industry to greater progressiveness and increased individual effort in order that electrical comforts and conveniences may be brought to a greater number of people and that there may be created an increased demand for electrical energy, wiring, appliances and apparatus."

On October 1st the league started the publication of an Electrical Page each Saturday in each of the daily papers. The Electrical Page consisted of 60% paid advertising and 40% news copy, with a large heading "Do it Electrically."

Beginning November 1st they started a series of prize essay contests. The winners of these contests were published on the "Do it Electrically" page. The prizes consisted of $40.00 in cash, divided as follows :

First Prize, $15.00; Second Prize, $10.00; Third Prize, $5.00; Five Prizes of $2.00 each.

There were no restrictions on the winning of prizes and with few exceptions the winners were never the same.

These essay contests were used to awaken the public interest as a preliminary to the Electrical Home exhibition. The Electrical pages were continued until March 1st; the essay contests were discontinued on the same date.

The League has received a great deal of assistance in their publicity work from the manufacturers, central stations, jobbers, and contractor-dealers. Some of the essays obtained in the prize essay contests were very interesting and brought out several new suggestions for sales help.

Owing to the great amount of space being used by the industry on the Electrical Pages the League was able to decrease the amount of the budget from $10,000.00 to $5,000.00

During the Christmas holidays they distributed a very attractive poster warning the public against the danger of using candles for decorative purposes on Christmas trees, and recommending the use of electrical equipment for this purpose.

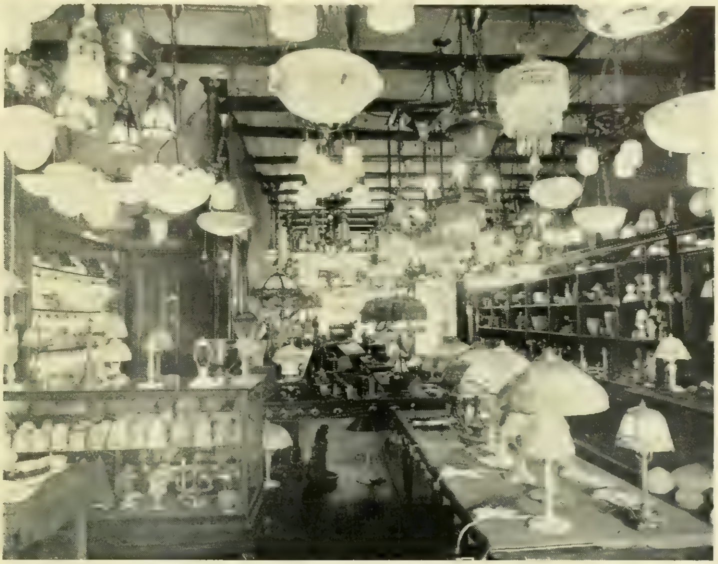
The League is now building the house for the Electrical Home. It is ideally located for this purpose on the main automobile thoroughfare through the centre of the city. There is a double street car line running past the house. They have a large illuminated sign on the property at present, informing the public of the purposes of the house. The builders advise that the Home will be completed, ready for the exhibition not later than May 10th.

Hamilton Electric Merchants Have Some of the Finest Stores to be Found Anywhere

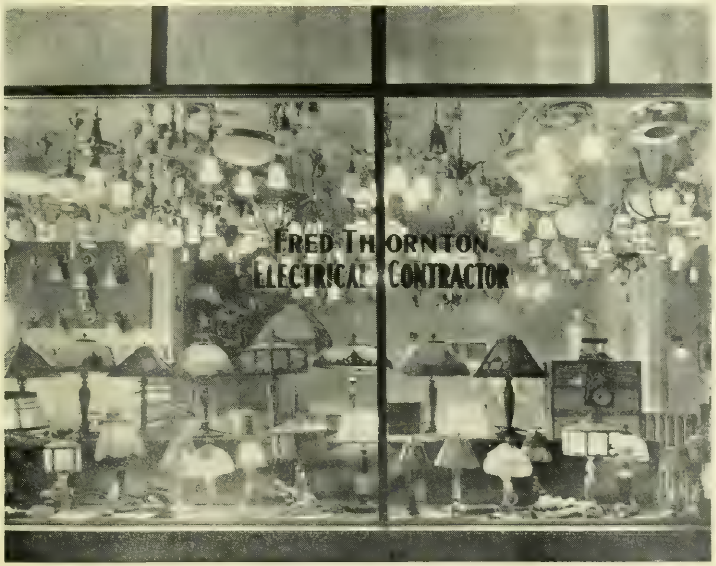
The "Hydro" is a big booster for doing it Electrically

In addition to his Association work "Joe" Cully is a real merchant

Attractive Hamilton Store Interiors That Create the Desire to Purchase



Naturally, Harold W. Chadwick has a handsome fixture display



Fred Thornton is a booster for the Hamilton Electrical League

Hamilton League Enthusiasts gathering inspiration from the big Queenston generator

The opening date of the exhibition has been set for May 13th at 2 p.m. and at present the plans call for the exhibition to be for two weeks. The house will be fully furnished, decorated and equipped throughout, including a garage with a car, and a water softening equipment so that all water used on the premises will be chemically pure. The grounds and exterior of the house will be flood lighted.

The Hamilton Electrical Development League have carried on this campaign at the minimum expense, which has been due entirely to the splendid co-operative spirit in the industry locally, each one connected with the industry having contributed very liberally with time and effort to make the campaign a success. It is very encouraging to note the progress of this spirit of co-operation which will ultimately prove very beneficial to the industry in Hamilton. The most striking improvement is the better spirit of feeling amongst the different branches of the industry and the discontinuance of bargain sales. They have had some wonderful meetings, chock full of good fellowship, where formerly there was nothing but jealousy and knocking.

The Electrical News is authorized to say that a most cordial invitation is herewith extended by the Hamilton League to all members of the industry who may find themselves within travelling distance of Hamilton to visit the Electrical Home exhibit any time during the two weeks following the opening date, May 13. Mr. A. K. Stalford, the director of the campaign, or any of his lieutenants, will give you a hearty welcome.

At a recent meeting of the Ontario Contractors and Dealers the members were guests of the Canadian General Electric Co., at their Wallace Ave. factory and were right royally entertained

Selling Suggestions for the Electrical Contractor and Dealer

Sales Hints Applicable to a Business of any Size, in any Locality. Talk "Main Wires Big Enough", "Convenience Outlets" and "Electric Servants". Study the Lists Given Below Very Carefully.

Profiting by the experience gained in their first Electric Home, The Electric Home League of Toronto made certain changes in their policy of conducting their second Home, which opened on April 1 and remained open until the evening of April 22—three full weeks and four Saturdays. Continued interest on the part of the public was the determining factor in extending the period one week beyond the original period set.

One of the refinements in the organization in the second Home which has been very fruitful of results is a set of typewritten memorandum cards given to each demonstrator, covering the points it is most desirable he should bring out in explaining to the visitors the electrical features of the particular room he is in charge of at the moment. These memoranda have been prepared following the experience of the previous exhibition, and during their use have been found of great value in directing the demonstration along the proper lines and thus ensuring that it should not get out of hand, so to speak, at any point. In other words, the demonstration and talk are always given in the most concentrated form when the demonstrator follows the instructions given in his memorandum.

Electrical contractors and dealers everywhere will find the suggestions contained in these memoranda very interesting and valuable. They will not only be useful in any locality where an electric home exhibit is being put on, but each individual contractor will find the series of very material assistance in selling a better wiring job to a customer. The Toronto "League" does not offer them as perfection, but merely as something that they have found of great assistance in their own work. Suggestions as to additions or changes would be very gratefully received. The address of the secretary is 24 Adelaide St. W., Toronto. We print the data contained on these cards below.

Let us repeat that every contractor-dealer will almost certainly find something of interest and information in these memoranda. If they could be taken as a basis upon which wiring contracts are sold to the architects, or the house-owners, it would mean a tremendous improvement in the standard of our homes from the electrical point of view. Five per cent of the total cost is the ideal we must work to, and no contractor should feel satisfied with any contract he is installing unless it is meeting this standard.

LIVING ROOM

1. Electric Home is shown by Electric Home league—a representative organization.

2. Entire electrical equipment—wiring, fixtures and appliances by **Electric Home League.**

3. Purpose — To show convenience of using electrical appliances in home properly wired.

4. Note the adequate number of **convenience outlets.**

5. So-called because of their convenience for connecting electrical appliances.

6. "Convenience outlets" are of the plug-in type—not old-fashioned screw type.

7. In building a new home, plan for sufficient number of "convenience outlets".

8. If your home is already built, they can be installed with little trouble and at nominal cost.

9. Electrical appliances selected by lot from various makers—all nameplates are removed—the appliances are displayed solely for the purpose of showing how easily they can be operated without unscrewing lamps.

10. Same provision can be applied to any house—large or small.

11. Phone—Stationary phone in kitchen. Portable desk phone can be plugged into "jacks" located in Living Room, Hall & Main Bedroom.

12. Proper lighting in the Home—have sufficient light—avoid glare. It is possible to obtain this result and still have attractive fixtures.

13. Wired tea wagon—with duplex convenience outlet and cord. Plug in anywhere. Use appliances right on the tea wagon.

In this room the well-located convenience outlets may be used for floor lamp, piano lamp, electric piano, electric cleaner, fan, tea samovar, kettle, toaster—**Make Main Wires Big Enough**—then you can have electric grate any time without re-wiring. Various styles and sizes.

DINING ROOM

1. In the Dining Room you will want appropriate lighting. The candle effect with silver finish is quite suitable. Control switch at door.

2. Dining Room is the field of usefulness for electric appliances for the table.

3. In showing electric appliances in the Home we have endeavored to avoid extremes. We are showing only those of practical use in the home.

4. A word or two about the appliances themselves—

The Electric Waffle Iron makes deliciously crisp Southern Waffles;

In the Electric Egg Boiler, eggs are placed in the basket and thus readily handled;

For Sunday Evening the Chafing Dish prepares the Creamed Chicken;

The Electric Grill for the quick breakfast—especially if the man has to prepare it himself.

5. It is not expected that you will have all these appliances right away—you will have most of them some day. **Provide the wiring so you can use them conveniently.**

6. Three or four "convenience outlets" are located about the room so that no matter where you place the Buffet or Serving Table, appliances placed on them can be connected.

7. You can also plug in an electric heater in Spring or Fall and avoid starting the furnace too early.

8. It has been a problem to provide connections for the appliances used in the Dining Table. Cords from the fixture are unsightly and will soon break the fixture—cords from the wall you will trip over—every time.

9. The Dining Table itself is wired. One cord connects to a "convenience outlet" in the floor. The "convenience outlets" just around the edge of the table make it easy to connect the appliances. Wiring is flexible so table can be extended.

10. In similar manner it is possible to wire Buffet.

11. Floor push will call the maid from the kitchen.

MAIN BASEMENT

1. Good lighting even in basement—enamelled reflectors direct light down where it is useful instead of letting it be wasted on ceiling.

2. Stairs well lighted— avoid falls—switch at top of stairs.

3. Electric water heater means safety and no fumes—hot water in 5 to 10 minutes—bath in ½ hour—switch in kitchen saves steps—comparatively little wiring required.

4. **Make main wires big enough.** So you can use electricity for heating water.

5. Distribution centre (fuse boxes). If your job is properly done, this part will cause you no worry.

6. Fuses are the safety valves of the electric system. If fuses blow, don't blame them for doing their duty. Have the trouble remedied.

7. Keep some spare fuses. Directory for circuits tells which one to replace, as well as the correct size.

8. Bell transformer operates bells from lighting circuit. No more batteries. Lasts a lifetime. Consumes little current and is very inexpensive.

9. We have low-priced power in Toronto. In a U. S. city of same size, power would cost 5 to 10 times as much as we pay. Yet this power is useless to you unless your home is wired properly so you can use it.

10. We have been advising you to **Make the Main Wires Big Enough.** How big? A pamphlet will be given out as you leave. It gives recommended wire sizes.

11. Wiring is usually left till very last for consideration. Then skimped in attempt to save. Often more is spent on "finish hardware"—door knobs and hinges—than on wiring.

12. **5% of your building cost will give you a good job.** Considerably less than cost of plumbing. A small price to pay for years of comfort and convenience.

13. Don't just look at the price—taking the lowest bidder—investigate—compare—see what you're getting for your money—**insist on having it done right** so that no part of it will ever have to be done over again.

LAUNDRY

1. Electricity makes housework play. Especially in the laundry.

2. The washing and wringing are done by the electric washer leaving time free for other duties.

3. Usually best to provide outlet on ceiling for washer so cord is kept off the damp floor.

4. After washing comes ironing. The electric ironer nicely irons most of the work—the roll is turned by an electric motor—the shoe is heated electrically. The pieces are passed through thus (demonstrate). It is not even necessary to stand. A bench is usually provided.

5. For one or two pieces in a hurry or for very fine work, the electric hand iron is used for the kitchen.

6. Very little wiring inside the house is required for the electric ironer—but be sure to **Make the main wires big enough.**

7. Observe that the light in this room is just where it is needed and that the switch at the door turns it on ahead of you.

8. The cost of operating an Electric Home like this is VERY reasonable. The monthly bill for this Home would run between $5.00 and $10.00 depending upon the care with which the equipment might be used.

9. Electricity as a helper in your home WILL—

(a) Enable servants to do better work more quickly.

(b) Make it easier to secure good help because your home is electrically equipped.

10. In many homes, electric labor-saving appliances make it possible to do without hired servants. Yet the housewife in such a home can do her work in a short time and with none of the old-time weariness.

KITCHEN

1. Kitchen is last room you will see in the Electric Home—last but not least in importance.

2. Electricity promises brighter and happier hours in the kitchen.

3. Good lighting—centre light with switch at door—bracket over sink—no shadows—light outside with switch inside—you can see who is there before you open the door.

4. Wall Phone. Phone calls need not disturb your work—the wall phone is at hand.

5. Annunciator—indicates whether the call comes from the Dining Room or one of the outside doors.

6. Ample "convenience outlets" are provided.

7. Over the sink for exhaust fan (with switch).

8. In the baseboard for the electric dishwasher which also serves as kitchen table—no more backaches washing dishes—no more reddened hands.

9. For electric iron—in ironing board recess.

10. Duplex "convenience outlet" over shelf—for toaster, percolator or possibly grinding and polishing motor.

11. Heater switch—the heater in basement is operated from here—saving steps.

12. With an electric range—the cleanliness—comfort—safety and economy of electric cooking can be yours.

13. **Cost to operate** — A study recently made of 42 homes equipped with electric ranges, other appliances and lighting —for one year—average bill per month—**only $2.96.**

14. **Make the main wires big enough** so you too some day can save money.

MAIN BED ROOM

1. Cheerfulness and comfort of this room is greatly increased by ample provision for electric service.

2. Duplex "convenience outlet" alongside bed—for boudoir lamp, electric cleaner, bed-warmer.

3. "Jack" for portable phone which at night can be brought up from downstairs.

4. In case of illness, lamp can be located under bed. Sufficient light for moving about room—no interference with sleep—same effect as aisles in movie theatres and Pullman cars.

5. If desired for burglar protection, a switch can be located at head of bed to turn on four lights outside doors: one at each corner of the house. Another switch can be placed in downstairs hall. Plenty of light scares away night-prowlers.

6. (South Wall) "Convenience outlet" for lamp on dresser or for portable electric heater.

7. (West Wall) "Convenience outlet" for **Wired Dressing Table,** hair dryer, massage vibrator, curling iron, portable lamp with counter-weight.

8. Good lighting—no glare, attractive fixtures—They are not disfigured by unsightly cords—**"Convenience outlets" do the work.**

9. Light in clothes-press. Should be a light in every one in the house.

10. Ceiling fixture controlled by switch at door. Place your switches close to doors and not behind them.

GUEST'S ROOM

1. In the Electric Home we are not selling appliances. No quotations are given.

2. As you leave the Home you will be given a pamphlet on the last page of which is a list of contractor-dealers. Electrical information and advice will be cheerfully furnished by any of them.

3. "Convenience outlets" are also a feature of this—the guest's room.

4. (East Side) "Convenience outlet" for Violet Ray outfit or other appliances for the dresser.

5. The traveller's iron is almost indispensable for ladies away from home.

6. (South Side) "Convenience outlet" for portable heater or electric cleaner.

7. Light in clothes-press controlled by door-switch. Turned "on" and "off" with opening and closing door.

8. (South Bracket) Latest development for convenience of the public. No more bare wires sticking out. Able to buy your fixtures with a plug as you now buy an electric iron. Then bring it home—hang it and connect it at one operation. At last, you can hang a fixture like a picture.

9. Comfortable lighting in the room—appropriate fixtures—switch at the door.

10. (North Side) "Convenience outlet" alongside bed for bed-lamp or bed-warmer.

11. Periodically, the housewife wants to change the arrangement of furniture. The "convenience outlets" should be arranged with this in mind.

12. Don't trail a cord from one side of the room to the other. You may trip over it.

13. **Use "convenience outlets"—properly placed.**

HALL AND BATH ROOM

1. "Convenience outlet" in hall for electric cleaner and electric floor polisher.

2. 3-way switches for hall lights up and downstairs.

3. Bathroom centre light controlled by switch in hall.

4. Good light for shaving by having bracket on each side of mirror. Only one light would throw the other side of face into shadow.

5. (Bath Room) "Convenience outlet" at convenient height can be used for immersion water heater, vibrator or hair dryer.

6. This is a very attractive bath room. People are learning that it is just as important to make sure of good electric wiring as it is to have good plumbing.

7. A good wiring installation can be provided for much less than the cost of the plumbing.

8. The day is not far distant when it will be very difficult to sell a house which is not properly wired.

NURSERY

1. The nursery—a room full of delight for the kiddies.

2. Lighting—pleasant—dainty fixtures—switch at door.

3. (South Wall) "Convenience outlet" for bed-warmer or portable heater.

4. (West Wall) "Convenience outlet" for milk warmer.

5. Every "convenience outlet" in this Home is of generous capacity. This provides maximum flexibility in that you can plug any approved portable appliance into any outlet.

SUN ROOM

1. Bright Sun Room—plenty of light—switch at door.

2. (South Wall) "Convenience outlet" for wicker table lamp and fan.

3. Electric sewing machine—pressure of the knee regulates the speed with exactness—fast or slow—the day of the tiring foot treadle is past.

4. (West Wall) "Convenience outlet" for sewing machine or portable heater.

5. You will observe that all "convenience outlets" in the Home are alike—they are standard.

6. Standard plugs have parallel blades—they are used throughout.

7. Use **Duplex** "Convenience outlets"—can connect two appliances at one time.

(NOTE: Show Duplex "Convenience outlet" with two-standard plugs having parallel blades.)

1st Floor Hall

(Given to upstairs party as they return to 1st floor Hall on their way to Dining Room. In rush hours—by traffic man. At other times—by man in Dining Room.

1. Verandah lights controlled by switch in hall.

2. "Convenience outlets" may be located on verandah for summer use—tea wagon—lamp—electric fan.

3. Hall lights upstairs and down controlled by 3-way switches.

4. "Jack" for portable phone.

5. "Convenience outlet" for torchere—electric cleaner and electric floor polisher.

Annual Meeting Electrical Supply Manufacturers Association

The annual meeting of the Electrical Supply Manufacturers' Association, held on April 6, resulted in the following election of officers for the year 1922-23: President, F. Jno. Bell; vice-president, E. G. Mack, managing director Crouse-Hinds Company of Canada and Harvey Hubbell Company of Canada; treasurer, Geo. D. Leacock, sales manager Moloney Electric Company of Canada; general secretary, J. A. McKay. In addition, the Board of Directors includes, Messrs. H. S. Balhatchet, Benjamin Electric Company; G. W. Arnold, Boston Insulated Wire & Cable Company; A. A. McKenzie, National Carbon Company; J. J. Sorber, Economy Fuse Company; T. H. Porte, Renfrew Electric Products Company; N. S. Braden, Canadian Westinghouse Company; C. H. Keeling, Square D. Company; A. S. Edgar, Canadian General Electric Company and C. F. R. Jones, Northern Electric Company..

Annual Meeting Electrical Supply Jobbers Association

The following officers were elected for the coming year at the annual meeting of the Electrical Supply Jobbers' Association, held in the King Edward Hotel, Toronto, on April 7: President, M. K. Pike, sales manager Northern Electric Company; vice-president, A. S. Edgar, manager Appliance Department, Canadian General Electric Co.; manager-secretary, J. A. McKay; chairman Central Division, C. A. McLean, Masco Company; chairman Eastern Division, R. J. Hiller, International Machinery & Supply Company.

Demanded Electric Outlets Like Electric Home

Mr. R. E. Hughes, electrical contractor, of Burgessville, Ont., is in the midst of a very active season. He has just completed the wiring of a local church, a community hall, and a store. As an indication of the way the farmers are clamoring for electricity it is interesting also to note that he has just wired the buildings of three farmers in East Oxford and has 25 farmers on his waiting list. In addition to this, he is equipping six of these farms with an isolated lighting plant. Members of the industry will be interested to know, also, that two of Mr. Hughes' customers visited the Electric Home recently shown in Toronto and, on their return, demanded that their own homes be provided with many of the conveniences shown there. Mr. Hughes wires many farm homes for ranges and hot plates, installing sufficiently heavy service to take care of the iron, electric washing machine, motor for pumping water, and other modern conveniences.

Successful Business Principles For Electrical Contractors and Dealers

Showing How to Figure Overhead and Illustrating the Fundamental Principles of Better Merchandising

By **LAWRENCE W. DAVIS**

Special Representative of the National Association of Electrical Contractors and Dealers

It is supposed that every man who engages in the business of electrical contracting or merchandising has a definite purpose; that he is qualified to perform his part; that he is just and honest; and that he will render service in accordance with his ability. The four following elements constitute the Fundamentals of a Successful Electrical Contractor-Dealer.

1. Definite Purpose:—To make money; To serve well.

2. Character:—Aggressiveness; Intensity; Cheerfulness; Open mind; Initiative.

3. Co-operation:—Seeking the best from others; Giving the best to others; Support your national and local organization; Read your trade journal.

4. Service:—An obligation owed to yourself, to the industry, and to the public.

To gain the greatest results from such fundamentals requires organization. No one man can do it all; but he can be the leader the active head.

Organization

Executive (Management):—Accounting; Financial relations; Stock; Selling; Service; Advertising.

Executive Management

Regardless of the size of a business the prime requisite for success lies in the complete control and knowledge of details of the business by the executive head. As the business grows to fair proportions it is essential that the executive have available at all times such information as will give him this complete knowledge without carrying the burden of the details in his head. This requires what may be properly considered the most vital organ in organization, accounting.

Accounting

He should provide knowledge of :—Purchases; Amount and Class of goods on hand; Cost; Overhead; Turnover.

Sales, Amount and Source: -Contracting Department; Store Sales; Fixtures; Repairs; Motors, etc.

Financial

Confidence of your creditors— jobbers and banks—is essential for the establishment and maintenance of credit. No other one thing can safeguard the credit of a business so thoroughly as to be able to present at the end of each month a statement showing that the executive manager has a complete knowledge and understanding of his business, even though the statement is not as strong financially as it should be. Credit is based upon confidence far more than upon financial rating.

Overhead

No other item affecting your business is so important as the absolute knowledge of the overhead cost of operating that business. No profit can be made upon any sale either over the counter or in construction work until the cost of making that sale, including its proportion of all the business expense, has been included in the selling price.

The following figures were taken from the result of a questionnaire submitted by the National Association of Electrical Contractors and Dealers to its 2,300 members throughout the country and represents an average, based on sales billed, which can be safely figured by contracting firms. With a strictly retail merchandising store this overhead amounts to considerably more, averaging about 30 per cent.

Average Overhead Percentages

	Per cent.
Non-Productive Labor	4.23
Salaries	8.48
Rent	1.51
Light, Heat and Power	.34
Postage, Tel. and Tel.	.43
Advertising	1.01
Depreciation	.65
Stationery and Printing	.41
Incoming Freight and Express	.58
Delivery Expense	.88
Insurance	.62
Taxes	.43
Bad Debts and Allowances	.72
Association Dues	.13
Maintenance	.68
Interest	.56
Miscellaneous	1.97
Total	23.63%

Knowledge of your overhead in itself, however, is not sufficient. Probably no other one thing is more responsible for failures among electrical contractors than lack of knowledge of how to use overhead percentage and to apply it upon the selling price of contract work.

It must be always remembered that this percentage of overhead is the relation of the cost of operating business to the gross business done and therefore must be applied upon the selling price, and not upon the cost of a given piece of work. This may be compared to the discount off from the list price of merchandise.

For example, if the list price of a washing machine was $142 and the discount was 30 per cent, such a discount would amount to $42.60, making the cost to the dealer practically an even $100. In order, therefore, to return the selling price of the article to its listed figure we cannot add 30 per cent but rather 42 per cent to the cost price of $100.

The great mistake of the average contractor has been that after ascertaining his overhead percentage he has added it to the actual cost of a piece of work and then added to that whatever profit he has felt like obtaining upon the job.

As a matter of fact, in most cases this process, instead of showing him a net profit upon his work, has left him with nothing, or at best very little net results to show for his efforts, and we find all over the country contractors who have struggled for years and made little or no headway in developing themselves.

The accompanying table shows the proper percentages which must be added to the cost price of any job to show respective profits of from 2½ to 20 per cent with an overhead from 10 to 30 per cent.

Attention is called to the importance of studying carefully the bulletins and tables provided by the National Association of Electrical Contractors and Dealers covering this subject, as well as the many other valuable helps which members of that organization may see by studying and using the National Association's Data and Sales Book. It is urged that those who are not now members of the National Association should at once join and avail themselves of this information.

Location of Business

The location of the contractor-dealer's business is an important factor and should be measured entirely from the standpoint of rent. Traffic, the opportunity to draw trade from the passing crowd, the nature of surrounding buildings and business, and the appearance of the store front are of greater importance than the amount of rent.

Rent

Economy in the amount of rent paid may prove an asset or a liability, based upon the results obtained in the location selected. To secure a store in a cheap location which does not obtain local trade may make that store a liability; on the other hand, rental of many times that lower amount may prove a great asset if it is balanced by drawing features which give the store a merchandising turnover of sufficiently greater amount. Do not measure your rent in dollars and cents, but rather as a percentage of the gross business done by your store. The average rent of the contractor-dealers for 1920 was less than two per cent of the overhead.

Intensive use of:—Windows; Store arrangement; Salesmanship.

These factors determine the success of your location rather than the amount of rent.

Stock

Choice of Merchandise: Careful consideration should be given to the quality of material or merchandise selected. These should be of the highest quality and when possible nationally advertised products backed by the reputation of thoroughly reliable concerns. See that it meets the needs of the class of trade catered to in that particular neighborhood.

TABLE FOR FIGURING THE SELLING PRICE

	Overhead Percentages (Cost of Operating Business divided by Gross Sales)								
Percentage of Net Profit Desired	**10%**	**12½%**	**15%**	**17½%**	**20%**	**22½%**	**25%**	**27½%**	**30%**
2½%	15	18	21	25	29	33	38	43	48
5 %	18	21	25	29	33	38	43	48	54
7½%	21	25	29	33	38	43	48	54	60
10 %	25	29	33	38	43	48	54	60	67
12½%	29	33	38	43	48	54	60	67	74
15 %	33	38	43	48	54	60	67	74	82
17½%	38	43	48	54	60	67	74	82	90
20 %	43	48	54	60	67	74	82	90	100

Percentage of mark-up to add to cost of labor and materials.

Explanation:—If your cost of operating business (overhead) is 22½%, and you desire a net profit of 15%, add 60% to the cost of labor and materials.

EXAMPLE:

Cost of labor and materials	$100.00
Add 60% to cost	60.00
Selling Price	$160.00

PROOF:

Labor and materials	$100.00=Cost
22½% of $160.00	36.00=Overhead
15% of $160.00	24.00=Profit
Selling Price	$160.00

Buying

Two elements should be carefully considered in purchasing stock:

1. Quantities:—

Great care should be taken that the quantity purchased should be based upon the ability to dispose of it within a limited period, without being tempted to overpurchase for the sake of a seeming advantage in additional discounts.

2. Turnover:—

The advantage of a thirty-day turnover will offset even the additional discounts for quantities, when such quantity purchases require several months to make a complete turnover.

Buy of local jobbers. By so doing it is possible to keep your stock constantly filled and your turnover close to thirty days, and through the fact that less capital is required you have a greater surety of meeting all bills promptly and securing cash discounts.

Watch your stock. Prevent depreciation, waste, leakage and dead stock.

Selling

Competent Sales People: Successful merchandising cannot be accomplished except through proper contact from the salesman or saleswoman who meets the customer. When the retail store is operated by a contractor engrossed in his contracting problems it is essential that the merchandising end of his business be handled by a competent assistant. Three adjectives may best describe the efficient sales person:—Aggressive; Attentive; Attractive.

Budget your sales plan:—Seasonable Sales; Special Sales.

Do not attempt to conduct your merchandising without a definite plan of action. Plan in advance each month, each week and each day what particular line of merchandise you are determined to push at that time. Stock allowed to remain dormant on the shelves will never sell itself profitably.

House Canvassing

Electrical appliances have been so developed today as to have established their value beyond the experimental or introductory stage. So-called "free trials" in the homes are expensive and entail a wasteful burden of cost on the public and the dealer. Demonstration of such light appliances as a house canvasser may carry should be pushed, as well as canvassing for customers for the heavier appliances, but first demonstrations on the heavier applinances should be made in the store and such order forms adopted to be signed by prospective customers as will encourage only bona-fide purchasers, to the end that the practice of "free trials" may be discontinued.

Time payments should be limited to twelve months or less; first payments on appliance sales should be as large or larger than subsequent payments; and all time payments should have a carrying charge added to the cash price sufficient to cover interest charges and cost of collection.

Store Selling

Store Selling:—Window displays; Store displays; Suggestions.

By suggestion is meant one of the most valuable points in merchandising, the calling attention of customers who are in your store to other lines of goods than that which they came in to buy.

All goods should be marked with uniform price tags, with all selling prices in plain figures. Price cutting and discounts under the list or recognized prices are undesirable and unprofitable, and should be used only as a last resort to move dead stock.

Advertising and Display

Co-operative Advertising:—Creative; Educational.

Co-operative advertising has a distinctive mission in itself, which cannot be accomplished through individual advertising. It is designed to create new business and new fields for selling through the education of the public to higher standards in the use of electricity, and better understanding of the advantages to be derived from using electrical appliances:

Individual Advertising:—Newspapers; Letters and Inserts; Store Arrangement; Window Displays; Attention, Interest, Desire, Action.

These four elements must be present in any window display to make it have a drawing power that will produce sales. The window must attract the attention of passersby through movement, light or color; must interest them either through its attractiveness or its novelty; must make them desire to possess some article which they see in the windows; and, finally, if the window display be worth anything in dollars and cents it must induce them to enter the store and buy.

Advertise Systematically

Budget your advertising:

Recommended for retail business of all kinds:—

3% to 5% of gross business.

Minimum recommended for contractor-dealers: 2% of gross business annually, divided as follows:

Annually—

Co-operative Advertising	½%
Individual Advertising: Newspapers, Mailing list, Window displays, Posters and trim	1½%

The annual advertising plan should be divided into seasonable campaigns and the total fund budgeted to fit this plan. A $50,000 business should spend at least $1,000 in advertising annually, which may be divided into $250 for co-operative advertising and $750 for individual advertising. Window displays and store trim are included in individual advertising, and should have money and thought devoted to them.

Annual Meetings and Other Activities of Contractors and Dealers' Associations

On May 1 the office of the Electrical Co-operative Association, Province of Quebec, will be moved to 61 McGill College Avenue, between Sherbrooke St. & Burnside Place, just above St. Catherine St., Montreal.

French Section Elects Officers

The French Section of the Contractor-Dealers Association, Montreal, at its annual meeting, elected the following officers and directors: N. Simoneau, president; W. Rochon, vice-president; J. N. Mochon, secretary; D. Vanasse, treasurer. Directors: J. O. Beaulieu, E. Hodge, M. Pelletier, L. E. Simoneau, O. Tardif, J. N. Tremblay and H. Truchon.

Licensing of Quebec Contractors

A delegation representing both the French and English Sections of the Contractor-Dealers Association, Montreal, recently interviewed the Deputy Minister of Labour, Mr. Louis Guyon, and urged government action in the matter of putting into operation the Act respecting the licensing of electricians, and inspection of electrical work, in the province of Québec. The Deputy Minister expressed sympathy with the desires of the deputation, and the Association is looking forward to action by the Government at a very early date.

Mr. J. A. Anderson Again President

The English Section of the Contractor-Dealers Association, Montreal, held its annual meeting recently and elected the following executives: J. A. Anderson, president; E. J. Gunn, vice-president; Louis Kon, secretary-treasurer; J. M. Walkley, R. S. Muir, M. R. Henry, H. Vincent and C. E. Barrett. Messrs. St. Amour, Rochon and Pelletier are the delegates of the French Section on the Contractors' and Jobbers' Arrangement Committee; Messrs. Anderson, Walkley and Gunn represent the English Section. This committee maintains a very helpful point of contact between these different sections of the industry.

Ontario Executive formally takes Control

A joint meeting of the provisional directors of the Ontario Association of Electrical Contractors & Dealers, and of the newly elected representatives to the Ontario Executive Committee was held in the Association secretary's office, 24 Adelaide St. W., Toronto, on April 5. At this meeting the affairs of the Ontario Association were formally turned over to the permanent executive committee which had been elected, and is constituted as follows:

V. B. Dickeson, Windsor District; George Bremner, Kitchener District; W. W. Stuart, Guelph District; J. H. Sandham, Niagara Pena. District; W. G. Jack, Hamilton District; E. A. Drury and Harry G. Hicks, Toronto District.

Mr. Harry G. Hicks was elected chairman, Mr. J. A. McKay was secretary and treasurer, and Mr. F. W. Wegenast continued as counsel.

The next meeting of the Ontario Executive Committee was arranged to take place at 10 a.m. at the Royal Connaught Hotel in Hamilton, May 17th. It was decided to postpone the convention until Fall in order to give the new executive an opportunity to get into harness.

The Licensing Bill now before the Legislature was discussed in detail with the solicitor present and a list prepared of changes desired by the Association. Then the entire matter was placed in the hands of the solicitor for immediate action.

The New Executive Committee is composed of very able and representative men, and the members of the Ontario Association may expect an aggressive administration. Much of the delay and inconvenience recently has been due to the fact that the new machinery had to be started.

In resigning the Ontario chairmanship and passing on this important work to his successor, Mr. McIntyre spoke as follows: "I desire to thank my many friends for their hearty support during the past five and one-half years—to wish for the Ontario Association a future of great usefulness, and to wish for each of you many years of prosperity.

"Some districts are still unrepresented on the Ontario Executive Committee for the reason that there is not yet in those districts a sufficient membership to warrant organizing an official district. Will members in unorganized districts please bend their efforts toward securing more members so that you may, at an early date, secure your district organization with representation on the Executive Committee."

Kitchener Electrical Exhibition
May 1 to 6

Hamilton Association Keeps Busy

A meeting of the Hamilton District Electrical Association was held Wednesday, March 29th. in the Board Room of the Y.M.C.A. Dinner was served at 6 P.M. This meeting was well attended by the electrical contractors, jobbers and manufacturers of Hamilton. A report was received from the executive committee on the Licensing of Electrical Contractors and Journeymen Electricians. The speaker of the evening was Mr. E. S. Jefferies, electrical engineer for the Steel Company of Canada, and president of the Hamilton Radio Society. Mr. Jefferies gave a very interesting and instructive talk in detail on radio apparatus and wireless telephony. He was assisted by Mr. George Crawford of the Hamilton Technical School. By means of a radio set a wireless talk was received from Dr. Culver of the Canadian Independent Telephone Co. at Toronto. From 9 P.M. until 9.45 P.M. wireless concerts were heard from Detroit. Chicago and Pittsburgh. At the close of the evening members were given an opportunity of listening to Trans-Atlantic messages and Washington Time Signals.

The Sun Electrical Company, Limited, Regina, Sask., have secured the electrical contract for the Prince Albert Jail. The net amount of the contract is $11,000.00. This building is being built by the Saskatchewan Provincial Government and the general contract is close to half a million dollars. The basement is now completed and the entire building is expected to be finished before winter.

Mr. D. A. Hills, 1039 College St., Toronto, has secured the electrical contract on a parish hall being erected at Avenue Road & Dupont St., Toronto, by the Church of the Messiah, at an estimated cost of $60,000.

A company to be known as the M. S. C. Radiophone Corporation of St. Thomas has been organized at St. Thomas, Ont., for the manufacture of radio telephones. It is understood that two types of equipment will be manufactured, a moderate priced one for the amateur and a higher priced one for commercial use.

Miscellaneous Trade Notes

A. H. Winter Joyner, Ltd., have moved their Montreal office from 701 New Birks Building to Room 606 in the same Building.

Messrs. Dawson & Co., Ltd., are moving from 148 McGill St., Montreal, to the ground floor of the Southam Building, 128 Bleury St.

The Perkins Electric Co., formerly at Phillips Place, Montreal, are moving to new offices and showrooms at 347 Bleury St., where they will carry a complete stock of fixtures and supplies.

The Associated Sangamo Electric Companies are distributing a little folder entitled "Generating electricity in 1870." The point is made that in short space of 50 years the electrical industry has developed from what was little more than an electro-plating operation into the second largest basic industry.

The annual report of the Walkerville Hydro-electric Commission, just presented by Mr. M. J. McHenry, manager of the Commission, to the town council, showed that the Walkerville System held third place in the province in the matter of total value of sales. Another interesting feature of this report was the fact that some 200 electric ranges had been installed in the homes of the citizens during the year 1921.

Kitchener Electrical Exhibition
May 1 to 6

New Books

"Principles of Electrical Engineering," by William H. Timbie and Vannevar Bush, is the title of a recent publication by John Wiley & Sons, New York. This book is the outcome of experience in teaching engineering students and is designed to present the basic principles of electrical engineering in a rigorous but understandable way, problems and examples being freely used. The chapter headings will indicate the scope of the work :

1. The Electrical Engineer; 2. Electric Units and Electric Circuits; 3. Electric Power and Energy; 4. The Computation of Resistance; 5. Electrolytic Induction; 6 The Magnetic Circuit; 7. The Magnetic Field; 8 Induced Voltages; 9. Magnetic Properties of Iron and Steel; 10. Generated Voltage; 11. Force on a Conductor; 12. Conduction through Gases; 13. Dielectrics; and an appendix of useful tables. Well illustrated, 498 pages, 5¼ in. x 7⅝ in. brown cloth binding. Price, $1.00.

Papers on Acoustics

"Collected Papers on Acoustics," Harvard University Press, Cambridge, Mass. This is a collection of papers written by the late W. C. Sabine, Professor of Mathematics and Natural Philosophy in Harvard University. The subjects covered are as follows: (1) Reverberation; (2) The Accuracy of Musical Taste in Regard to Architectural Acoustics. The Variation in Reverberation with Variation in Pitch; (3) Melody and the origin of the musical scale; (4) Effects of air currents and of temperature; (5) Sense of loudness; (6) The correction of acoustical difficulties; (7) Theatre acoustics; (8) Building material and musical pitch; (9) Architectural acoustics; (10) Insulation sound; (11) Whispering galleries; also an appendix dealing with the measurement of the intensity of sound and the reaction of the room upon the sound. The book is printed on heavy stock, mat surface paper, and well illustrated. 280 pages 7½ in. by 10½ in. Stiff red cloth binding. Price $4.00.

New Trade Publications

The Hydro-electric Power Commission of Ontario has issued Specification No. 16, which covers the construction of and tests on electric ranges. Copies of this Specification may be obtained by addressing the Commission at 8 Strachan Avenue, Toronto.

The Ohio Brass Company are distributing an illustrated folder, entitled "Sixty per cent. increase in trolley wire life."

The Taylor-Campbell Electric Co., of London, Ont., manufacturers of electrical supplies, have a catalogue, which they are distributing on request, covering their line of equipment, which includes outlet and service boxes, switch plates, cutouts, rosettes, etc.

Spielman Agencies, Montreal, are distributing a booklet entitled "Insulating Varnishes and Compounds and their Practical Application." This booklet is full of useful information and helpful hints, not only with regard to Griffiths Brothers' products, but also with regard to insulating materials in general and the protection and finishing of coils, electrical machinery, etc.

The Wagner Electric Manufacturing Co., St. Louis, Mo., are distributing an attractive bulletin, No. 130, entitled "Light for motion picture projection."

The Kingsbury Machine Works, Frankford, Philadelphia, Pa., are distributing Catalogue "C" on Kingsbury thrust bearings. This catalogue has been completely re-written and includes much new matter of considerable value to engineers in general. Particular attention is called to the following features: Standardization of dimensions; power loss guarantee; combined vertical thrust and journal bearings; the Queenston development; propeller thrust bearings; actual power loss determinations; standardization of power losses.

News From the West

Mr. Clive Planta, formerly secretary of the Vancouver Electric Club, was the speaker at the weekly club luncheon on Friday, April 7th, on the occasion of his return to the Coast from a two or three month's sojourn in Toronto. He bore with him a fraternal greeting from the Toronto Electrical Club, which Secretary Lightbody was requested to acknowledge suitably. There were two leading topics which Mr. Planta dealt with in his address. The first was that of the Electric Homes' campaign. Mr. Planta had been given special attention by the Toronto committee, in view of the fact that he was anxious to tell the industry in Vancouver just how the excellent results had been obtained. He was shown over the second of the Electric Homes, and given full data as to details of preliminary arrangements, management of the exhibit, and methods of instructing the public who visited it. This information, noted carefully at the time of his visit, the speaker summarized and explained to the club members. It was a timely topic for Vancouver electrical people are very much interested in demonstrating electricity for the home.

Illuminating problems were dealt with in a highly instructive manner by Mr. Planta. Disclaiming any pretentions to be an "illuminating engineer," he gave some of the practical results worked out in many store premises in Toronto, where scientific lighting methods applied had increased the illuminating effect, at a reduced cost for light bills, and at the same time removed many of the defects from naked lighting. This, he said, was one of the livest subjects he had found in his experiences in the east, and he looked on it as one of the greatest fields for the practical electrical engineer to-day.

The Latest Developments in Electrical Equipment

A Pump That Handles Semi-solids

The choking of pumps operating on semi-solids is an unpleasant experience with which most engineers are familiar and the consequent cost of removing the obstruction, the burning out of motors in electrically driven pumps and the slipping and burning of belts in belt operated installations, are serious items which pump manufacturers have long been endeavoring to eliminate. The Unchokeable Pump, Limited, of London, England, whose Canadian agents are Jones & Glassco Reg'd., of Montreal and Toronto (Bank of Hamilton Building,) have made these problems their special study and as a result of many experiments have evolved a type of pump which they claim ensures that whatever is capable of passing through the suction must be swallowed and discharged, and handled in a better and more economical manner than could be the case when hand labor is employed. The "Unchokeable Pump" is constructed to withstand the work inseparable from the constant pumping of sludge, fibres, semi-solid and solid matter. In principle the pump operates upon ordinary centrifugal lines but in internal detail it differs from any other. No screens are necessary, for large objects that pass through the suction are ejected at the delivery. It is particularly designed to pass unscreened sewage, rags, cotton waste, fibre and all kinds of pulp and trade effluent from textile work in general. It has been found impossible to make the pump choke with solids or semi-solids, no matter how quickly or in what quantity they may be drawn into it.

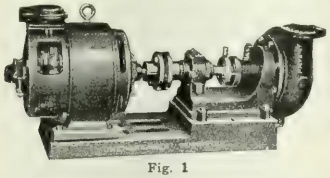


Fig. 1

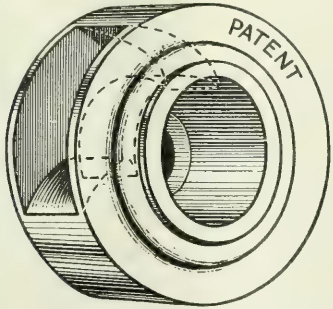


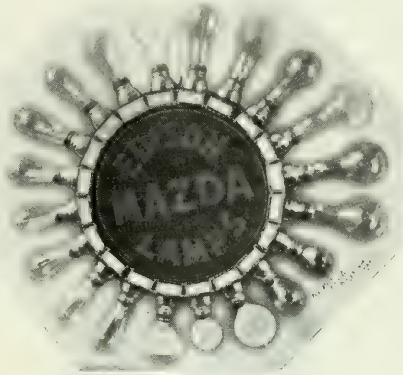
Fig. 2

Fig. 1 shows a pump complete with motor drive, and Fig. 2 shows the patent forms of impelling. The pump shown is motor driven with flexible couplings but belt drive and vertical pumps are also supplied. Parts are interchangeable and the impeller can be taken out and replaced. The bearings are ring oiled. Pumps of this type have been used for the handling of coal, gravel, rock ore, sand, etc., for leaves, sewage of chemical composition, and for fluids, whether containing acids or alkalis.

The Unchokeable Pump, Limited, is supplying 6 in. vertical pumps, with special impellers, for sand and small stones, for the Mersey Docks and Harbor Board, England. These are to be used for throwing up excavated matter containing small stones to a height of 120 ft. These pumps if used to throw to a height of 60 ft., can handle stones up to 5 in. diameter.

A Convenient Lamp Rack

The lamp-rack illustrated below is the property of the Sun Electrical Co. of Regina, Sask., and is one of the neatest display schemes seen in that province. This rack is suspended immediately above the lamp selling counter. The portion of the rack which holds the lamps may be easily revolved. The lowest lamp of the group is always lighted which is accomplished by a series of contacts within the bottom of the rack. Each lamp has a small price card stating the wattage, type and price. The front sign which reads "Edison Mazda Lamps" remains stationary and does not revolve with the rack. The rack, aside from the sign and metal parts, is made of hardwood finished in mahogany to match the other fixtures. The company states, "We have found this rack extremely useful in selling lamps. We can serve a customer very rapidly as we can give instant comparison of all the popular sizes and types of lamps. We find with this rack that the sale of special kinds such as Daylite, bowl frosted or mill type lamps is greatly increased. We find that breakage is reduced to a minimum as there is no necessity to handle lamps except in testing and packing."

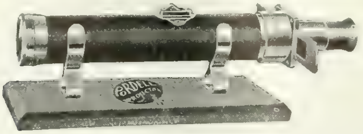


Ibbotson Electric Co., Shoal Lake

Mr. A. R. Ibbotson, proprietor of the Ibbotson Electric Company, Shoal Lake, Man., sends us an interesting letter. Mr. Ibbotson was formerly superintendent of the town of Souris (Man.) electric light & power department, and for a number of years also maintained an electric shop in that town. Later he was superintendent of electric light in Shoal Lake, but since March, 1920, has been in business for himself installing electrical work, distributing supplies and fixtures, installing isolated electric plants, etc. He has two sons in the electrical business, the eldest of whom was overseas, in the Wireless Section of the Royal Canadian Flying Corps. Mr. Ibbotson writes that the municipality does not carry electrical supplies, which is another evidence that his company is supplying the demand for electrical appliances and equipment in a satisfactory manner.

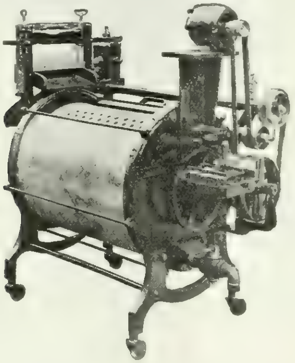
Flash Light Magic Lantern

The Pordell Projector Company, [illegible] East [illegible] St., New York City, has placed a flashlight Magic Lantern on the market. This device projects on a screen "views" from standard movie films; these being obtained, in a large assortment of views, by the manufacturers through an arrangement with a film distributing company. The apparatus consists simply of a flashlight battery mounted to an ebonized baseboard. A reflector and lamp unit containing a small metal slide carrier and lens all contained in a metal projecting apparatus, combine to produce practically fifteen times the light usually obtained from an ordinary flashlight battery, according to the maker. This patented feature makes it possible through the pushing of a button to enlarge a 1-in. film view up to a 9-ft. picture.



The "Sumbling" Washer

A new washing machine just placed on the market is the "Sumbling," manufactured at 7 St. Mary's St., Toronto. Machines are made in different sizes so as to include everything from the largest institution to the smallest home. A feature of these machines is a patented single belt reverse movement, which is said to ensure uniformity of rotation in both directions, reduces friction and wear to a minimum, economizes in belting, etc. The claim is made that their smallest washing machine for semi-commercial work is the only machine in small compass that will consistently stand the strain of commercial washing. Special features named by the company are: fluid-tight joints, reversible wringer, special belt tightener and an oiling system that is easily accessible even while the machine is in motion.

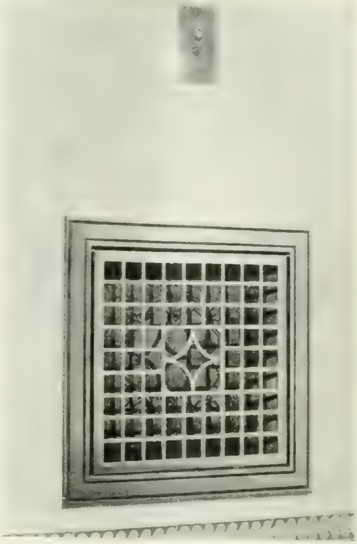


Folder on Shurvent Fuses

A thoroughly vented renewable fuse, recently developed, is discussed and illustrated in Folder 4472, entitled "Shurvent Protection," which has just been published by the Westinghouse Electric & Manufacturing Company. The folder explains the application and design of fuses for the protection of low-voltage circuits up to 600 volts for both alternating-current and direct-current.

A Heater for Bathrooms

The Electric Bathroom Heater, here illustrated, is manufactured by the William H. Jackson Company, 2 West 47th St., New York. The register grill is of cast brass, but may be had in either nickel, silver or gold. The heater may be had in various capacities, though generally supplied with a 1 kw. rating. It is placed in a recess in the tile of the bathroom wall, the illustration showing the neat effect produced. The snapswitch shown above controls this heater. All hazards due to accidental groundings appear to be removed by installing heaters in this way.



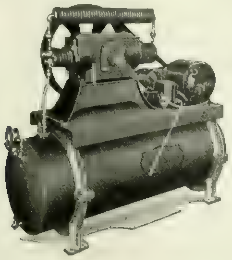
They Appreciated Mr. Skelton

Mr. J. Skelton, the veteran salesman of the Hoover Suction Sweeper Company, withdrew from that company on April 1st, in order to devote his entire energy to the manufacture and sale of the floor waxer and polisher which he recently placed on the market. The occasion was made the "excuse" for one of those enjoyable "Get-together" suppers of Hoover retail men, to which they all look forward with real anticipation. Mr. Thos. Kelly, Canadian sales manager, presided. Next to the menu, the feature that pleased everybody most was the presentation of a very handsome table lamp to Mr. Skelton, as an appreciation of the very kindly feeling that had always existed between Mr. Skelton and the Hoover Company, and as a permanent reminder of their regret at losing him. Mr. Skelton, with his seventy-odd years—but looking only half of it— and who is generally referred to as "the grand young man of the electric sweeper industry"—made a very happy reply, in which he further emphasized the kindly relationship that had existed for a dozen years—and would always exist— between the officials of the Hoover Company and himself.

The dinner was held in the King Edward Hotel and was attended by some dozen or more of the company's agents, including Mr. R. N. Connor who had also been with the Hoover Company for some years but is now withdrawing to associate himself with Mr. Skelton in the manufacturing business.

Motor driven air compressor for garage

For service in garages, tire repair shops, filling stations and similar places, a line of electrically operated air compressor outfits have been developed by The Auto Compressor Company, Wilmington, O. The outfits are furnished for operation on single or polyphase alternating currents, 60 cycles, 110 and 220 volts, and for 220, 110 and 32 volt d.c. circuits. The two-stage outfit, Model A-25, illustrated, has a low pressure cylinder of 2½" bore and a high pressure cylinder of 1-5/16" bore. The stroke is 2½". The compressor is air cooled, operates at 350 r.p.m., and has a displacement of 2.48 cubic feet per minute. The single stage outfit, Model E-68, has a compressor of 2" bore by 2½" stroke. It operates at 550 r.p.m. and has a displacement of 2.5 cubic feet per minute. The tank for both outfits is 16" diameter by 48" and has a capacity of 38 gallons. An automatic diaphragm pressure switch cuts the motor in at a pressure of 120 pounds and cuts it out when the pressure reaches 150 pounds. The air is filtered to free it of oil and other impurities before it enters the tank. The two-stage outfits for single phase a.c. circuits are equipped with Robbins & Myers ¾ h.p. Type "R" repulsion-induction motors. Outfits are also furnished with polyphase induction motors and with direct current motors for polyphase and direct current circuits. The single-stage outfits are equipped with ½ h.p. motors. Each outfit is furnished complete with motor, tank, compressor, automatic switch, pressure gauge, filtering apparatus, belt, all connecting piping, and 25 feet of air hose with chuck. Either outfit can be installed in a floor area of 49½" x 20". The net weights are 450 and 380 pounds respectively for the two-stage and single-stage outfits.



Dominion Engineering Works, Ltd., get large contracts

As noted briefly in our last issue, the Dominion Engineering Works, Limited of Montreal, Canada, have been awarded the contract by the Manitoba Power Co., for two 28,000 horse power vertical shaft, single diagonal-type runner, hydraulic turbines which will be installed in the Great Falls Plant during the latter part of the present year.

Although a young company—having been established in 1920—they have already attained an enviable position in the industrial field, more especially in the manufacture of large hydraulic turbines, Johnson valves, paper machines, etc., which, by reason of their size, are beyond the capacity of the average plant. Among the important contracts completed or under construction by this company may be mentioned: Two 11,2000 h.p. turbines for the Cedars Plant of the Montreal Light, Heat and Power Co., being the largest dimension turbines in the world; two 22,000 horse power turbines for the Laurentide Power Co.; one 41,000 h.p. turbine for the Shawinigan Water & Power Co., the cast steel scroll casing of which is the largest yet built in this or any other country; two 72 in. x 166 in., 1000 feet news machines for the Laurentide Paper Co.; one 20 ft. Johnson valve for the Shawinigan Water & Power Co., etc. In addition to the larger units above mentioned, the company also specializes in units of smaller powers; among those already constructed may be mentioned: One 1500 horse power turbine for the Montreal Light, Heat & Power Co.; four 2900 horse power turbines for the Spruce Falls Co., Limited; one 3550 horse power, horizontal, double runner turbine for the International Nickel Co., of Canada, Limited.

Speed regulation is one of the most important factors in connection with hydraulic turbine operation for the generation of electrical energy, the exacting requirements of electrical engineers making it necessary to operate at practically constant speed. In order to accomplish this successfully, it has been found advisable to design a special type of governor, the manufacture of which requires mechanical skill of the highest order. Several governors of this manufacture are now in successful operation. One thus sees the wide range of work this company is capable of handling, varying as it does from the larger and more massive parts of turbines to the intricate and minute parts of a turbine governor and it is not difficult to realize that their capacity for the manufacture of all classes of work be it large or small, must be practically unlimited.

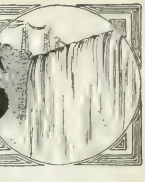
It is a tribute to the sagacity and foresight of the founders of this company that, within a period of three years, they have organized and equipped an industrial establishment capable of manufacturing the largest and most massive machinery yet developed. That they are an asset of nation-wide importance can readily be understood when it is mentioned that, previous to their inception, all machinery of the sizes above mentioned, had to be imported. They are licensees in the British Empire of the well known firm of W. Cramp & Sons Ship & Engine Building Co., of Philadelphia, Pa., whose improvements in the signs and manufacture of hydraulic turbines have been a contributing factor in the rapid development of this type of machinery. Standing as we are at the commencement of an era of intense development of our natural and other resources, it is fair to assume that the Dominion Engineering Works, Limited, by reason of their capacity to manufacture work of this magnitude, are destined to assist materially in this development.

The Canadian Line Materials, Ltd., Toronto, are distributing an attractive catalogue, well illustrated, describing their products, which include pine brackets, specialties, cross arms, street lighting fixtures, ground rods, anchor rods, anchors and racks.

Midsummer Meeting in Niagara Falls

At a meeting of the Executive Committee of the A. M. E. U., held in Toronto on April 20, it was decided to hold the mid-summer convention, as usual, at the Clifton Hotel, Niagara Falls, Ont. The date was fixed as June 22, 23 and 24. A tentative program was arranged, which will include papers on street lighting, construction accounting, accident prevention and health promotion. A banquet will be held on the evening of the 22nd, to be followed by a radio demonstration. The program will, of course, include a trip over the Chippawa-Queenston development, on Saturday morning.

Electric Railways



Modern Street Car Lighting

Proper Illumination Almost as Essential in Street Cars as in Merchandising Establishments, to Attract Business

BY J. A. SUMMERS*

Business men have found that light draws trade. This has been so definitely proven that few would attempt to contradict it. We see the results on every side; the crowd gathers where the bright lights are; they stop and examine the brightly lighted show window; they drift unconsciously to the brightly lighted theatre entrance or restaurant. If the street cars are made bright and attractive it is perfectly logical to assume that human nature will react in the same manner with regard to street cars as it does in other lines.

That the public does react in this manner was definitely shown recently in the subway here in New York. On some of the local trains alternate cars had about twenty-five per cent more light than the others and it was observed that the brighter cars were occupied before the others. Experiences of this kind indicate that it is entirely logical to apply merchandising methods to attract passengers.

I have heard some say that it is not necessary to attract passengers. This may be true in some cases, but in the large majority of cases the railway company is exerting every effort to attract the public to its cars.

There is severe competition in many places between the street cars and jitney 'buses and it behooves the traction company to make their cars as attractive as possible to hold their prestige. The statement that people have to ride anyhow regardless of conditions is not tenable. It is true that a great many are absolutely dependent on the trolleys to get to and from work, but the profits of the company depend largely on the number of people who can be induced to ride who are not forced to ride. Brightly lighted cars are without question a powerful aid in attracting these casual riders, and hence, the proper illumination of cars should receive very serious consideration.

It is unfortunate but nevertheless true, that even at the present time, illumination is often an afterthought or an annoying necessity to be disposed of as expeditiously as possible. Proper illumination cannot be provided by simply ordering several circuits of small lamps to be installed, and thus dispose of the matter without further thought or attention. I am glad to say that most of the large companies realize the importance of illumination and make very thorough investigations of lighting conditions, some of which have been reported in papers before the Illuminating Engineering Society.

There are a great many variables to be considered in planning the lighting of a car. The interior finish of the car, the voltage regulation, arrangements of the seats, and the standard of lighting in the community have a very decided bearing on the selection of the proper lighting equipment.

The interior finish makes a great difference in the resulting illumination. This is true regardless of the reflector equipment. A car with a dark finish is likely to appear dark even though the photometer shows that the illumination is adequate. The psychological effect of such a car is depressing and the passengers feel that there is insufficient illumination,—hence the unjust criticism. A gloomy car also suggests uncleanliness and frequent resentment is expressed by passengers because of being compelled to ride on "dirty, gloomy cars." This feeling does considerable harm to the railway company not only by causing the antagonism of the public but by repelling the short-haul passenger.

A flat white ceiling with light color woodwork is of course most desirable from an illumination standpoint, but a light tinted ceiling, which many companies prefer, is quite satisfactory. Such a finish will add 20 to 40 per cent to the illumination secured with the dark green ceiling so often seen, and naturally, the car will appear much brighter and more cheerful. If a gray tint is used, the paint should be mixed with vermillion and emerald green and reduced with white until the proper tint is secured. A gray that is mixed with lamp black has a much higher absorption than a warm gray mixed as above.

The shape of a ceiling also has a decided bearing on the illumination. The old ceiling with the deep half decks is rapidly being displaced with a curved ceiling extending in one sweep over the width of the car.

This is a much better arrangement from a lighting standpoint than the old one because the light is not bottled up in the narrow area between the half decks. This arrangement also provides better light on the advertising cards.

The amount of light necessary and the arrangement of the outlets are matters that have received considerable attention and aroused a great deal of discussion. It is a relatively simple matter to state the minimum requirements for safety and for reading without eyestrain, but this does not really satisfy the conditions from an economic standpoint. The standard of lighting in offices, stores and industrial plants has risen materially in the last few years and this naturally influences the public's demand for higher intensities in street cars.

An average of 3.5 to 4.0 ft-candles in a car was considered very good lighting several years ago, while now there is a strong tendency to go at least 10.0 ft-candles and even higher so as to conform to the new industrial standards. This is not an unreasonable intensity, and can easily be secured with proper reflectors with an expenditure of power of about two watts per square foot of floor area.

One must not forget the fact that the 10 ft-candles measured in an empty car at rest and with lamps operating at normal voltage will be reduced to not over 6.0 foot-candles when the car is crowded and the voltage lowered as much as it is on the majority of trolley lines. The cross reflection which adds up in the empty car is also entirely absorbed in a crowded car, and due allowance should be made for this fact when estimating the desired intensity.

A much higher intensity is necessary to read comfortably in a street car than in a home or office, because the vibration and jolts of a rapidly moving car cause a rapid movement of the reading matter which is hard to follow without great eyestrain under low intensities. Many tests on the speed of vision have shown that an intensity of 10 ft-candles is necessary to read rapidly changing print.

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*A paper presented before the Illuminating Engineering Society.

One row of lamps on the center line of the car is the most economical way of placing the units, and an illumination test in an empty car would show a satisfactory distribution of light. The results are also fairly satisfactory to the passengers if the seats are arranged across the car. In this case the standing passengers do not cast objectionable shadows on the seated passengers. However, if the seats are arranged longitudinally the results are often unsatisfactory whenever there are standing passengers. The arms and hands holding on to the overhead straps effectually bar the light from reaching the seated passengers. In the latter case, therefore, use should be made of two lines of units, placed just inside the edge of the seats. In all cases medium density opal reflectors should be used and in no case should they be spaced more than 5.0 ft. apart. If the units are placed under the half-deck it is of prime importance to use reflectors as a standing passenger is so close to the lamps that to him a bare lamp is exceedingly annoying. Bare lamps in this position also detract from the advertising value of the cards under the half-deck because of the glare.

Many accidents have occured to passengers alighting from street cars because of inadequate light at the steps. Persons are temporarily blinded when going from a brightly lighted platform to the dark steps and many serious falls have resulted. Several methods have been satisfactorily tried to solve this problem. One is to utilize one circuit just inside the door to operate when the door opens. Another method is to set a lamp in a recess at each end of the step, each lamp operating in series with the circuits inside the car. The latter method is the better one when the construction of the car permits its use.

The principal points to consider in designing the illumination of a car, either new or when remodeling, is the value of a light finish on the ceiling, the use of a proper reflector, spacing of the lamps not to exceed five feet, and an intensity high enough not only to make comfortable reading but to attract passengers to a well lighted cheerful car.

An Ontario Act Respecting Construction of Municipal Radials

A Bill was recently introduced by Premier Drury in the Ontario House, entitled "An Act respecting the construction and operation of municipal electric railways."

The Bill provides that on the request, expressed by resolution, of the corporations of two or more municipalities, situate in any locality in which electrical power or energy may be supplied by the Hydro Commission, the Commission, as the agent of such corporations and at the expense of such corporations, may investigate the cost of constructing, and the advisability of constructing, the desired railway.

A section in the Bill enables such corporations to enter into an agreement with each other for the construction, equipment and operation of an electric railway.

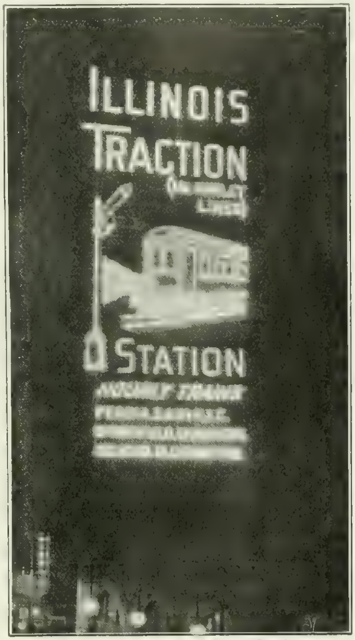
The agreement must be submitted to a vote of the electors qualified to vote on money bylaws, the bylaw to recite the estimated cost of the work, the annual maintenance and sinking fund charges, the portion of costs to be borne by each corporation, and the estimated probable revenue.

The Bill also outlines the conditions under which money may be raised for the prosecution of this work, and for the appointment of an Association to care for the construction, equipment and operation of the railway.

In effect, the Act means that any group of municipalities may build radials if they are willing to undertake to bear the capital expenditure and the proper maintenance. The Hydro-electric Commission must approve of the work, and power to operate the system must be purchased from the Commission. In short, it appears to be the wish of the Government to assist municipalities in every possible way to build hydro-radials where there is a reasonable guarantee that they will be a financial success. The Government, however, disclaims any responsibility whatever as regards either capital cost or maintenance.

Electric Railway Publicity

Canadian electric railway men will be interested in the illustration herewith. It is one of the most attractive displays in the city of St. Louis, and is a continuous advertisement for the Illinois Traction Company. The semaphore raises, the headlight lights up, the wheels begin to turn, the track moves back and the car apparently makes headway.



Advertising Electric Railway Service

The British Columbia Electric Railway Company recently placed all their street cars in Victoria, B. C., under one-man control.

A new trackless trolley bus has been delivered at Walkerville, Ont., and is to be used on Lincoln Road.

Quebec R. L. H. & P. Annual

At the annual meeting of the Quebec Railway, Light Heat & Power Company, held recently, a number of changes were made in the Board of Directors, which is now composed as follows: E. A. Robert, Hon. Lorne C. Webster, J. N. Greenshields, H. G. Valiquette, Col. J. E. Hutcheson, K. B. Thornton, C. G. Greenshields, Hon. Geo. E. Amyot, Hon. Adelard Turgeon, Hon. D. O. Lesperance and A. C. Barker. At a directors' meeting, the following officers were elected: E. A. Robert, president; Hon. Lorne C. Webster, vice-president; W. J. Lynch, general manager; A. Lemoine, secretary; and R. A. Wilson, treasurer.

Current News and Notes

Brockville, Ont.

To take care of the increased load brought about by the establishment of the Eugene F. Phillips Electrical Works at Brockville, Ont., the Hydro Commission are rebuilding their line between Brockville and Morrisburg, increasing the voltage from 26,500 to 44,000.

Coleman, Alta.

The town council of Coleman, Alta., contemplates the installation, in the near future, of an electric light and power service.

Emerson, Man.

The town of Emerson, Man., contemplates the installation of a new electric plant this spring.

Fort Frances, Ont.

A press report states that the International Radio Development Company has been formed and will instal a large radio station at Fort Frances, Ont.

Hull, Que.

Stanley Lewis, 63 Metcalfe St., Ottawa, Ont., has been awarded the electrical contract on a $50,000 apartment house being erected at Aylmer Road, Hull, by Mr. Geo. E. Hanson, 11 Front St., Hull.

Mr. E Martel, Wright St., Hull, Que., has been awarded the contract for electrical work on an addition being built to the building at 131 Main St., Hull, owned by Mr. Ls. Bertrand.

Joliette, Que.

Mr. Fortunat Giroux, formerly superintendent of the municipal electric plant at St. Jerome, Que., left on May 1 to assume the position of electrical engineer & general manager of the municipal system at Joliette, Quebec.

London, Ont.

Messrs. R. H. Cunningham & Co., Walkerville, Ont., have secured temporary premises at 351 Glebe St., London, Ont., where the manufacture of electric furnaces will be carried on.

Mimico, Ont.

Messrs. Warren & Fordyce, Mimico, Ont., have been awarded the contract for electrical work on a public school building being erected at Mimico, Ont., at a cost of $70,000.

Montreal, Que.

The Canadian Westinghouse Co., 285 Beaver Hall Hill, Montreal, has been awarded the contract for electrical equipment in connection with the electrical pumping station at Pointe St. Charles.

New Glasgow, N. S.

The Nova Scotia Power Commission has been asked to submit a proposition to provide power to Pictou, Stellarton and New Glassgow, by developing Malay Falls, on the East river, Sheet Harbor. A cost of 1½ cents per kw.h. to the towns, has been suggested.

Oakville, Ont.

The town council of Oakville, Ont., recently decided to proceed with plans for the installation of an auxiliary generating plant, which would make the town independent of Niagara power in the event of a power tie-up. The proposed plant will probably cost in the neighborhood of $32,000, and will probably be operated by gasoline engines of 300 horse-power.

Mr. B. E. Sprowl, Oakville, Ont., has secured the contract for electric wiring on a $60,000 residence being erected at Oakville by Mr. J. Allan Ross, and a $50,000 residence being erected on the Lake Shore Road, Oakville, by Mr. H. G. Kelly.

ed on Glidden Ave., Oshawa, by the Oshawa Housing Commission.

Ottawa, Ont.

The Dalhousie Electric Co., Dalhousie St., Ottawa, Ont., has been awarded the contract for electrical work on a new cooling plant being erected on Besserer St., Ottawa, by the Swift Canadian Packing Company.

Mr. E. Headley, 645 Echo Drive, Ottawa, Ont., has been awarded the contract for electrical work on a Mission building recently erected in Billings Bridge District, Ottawa, by the St. Matthews Anglican Church.

Point Grey, B. C.

Mr. Ernest J. Pierce, 3530—28th Avenue W., Vancouver, has secured the electrical contract on an $86,000 addition being built to the Prince of Wales School, Point Grey, B. C.

Riviere du Moulin, Que.

La Cie Electrique, Chicoutimi, Que., has been awarded the electrical contract on a cold storage plant being erected at Riviere du Moulin, Que., by Mr. J. H. Potvin, of that place.

Saskatoon, Sask.

The Wheaton Electric Co., Saskaoon, Sask., has secured the electrical contract on a Chemistry Building, for the University of Saskatchewan, being erected at an estimated cost of $602,000.

Swan River, Man.

The town council of Swan River, Man., are having an electric lighting plant installed there this spring.

Vancouver, B. C.

The Johnson Electric Co., Ltd., 1633 Vennes St., Vancouver, B. C., has been awarded the electrical contract on a store being erected at 2756 Granville Ave., Vancouver, by Mr. A. V. Lewis, 1202 Seventh Ave.

Windsor, Ont.

Provision is made for an electric range in each flat of a 16-flat apartment house for which plans have been drawn by Mr. G. P. Jacques, architect, Windsor. This building will be erected on Victoria Ave., Windsor.

The Essex Electric & Construction Company recently opened a store at Chatham & Ferry Sts., Windsor, Ont., where they will carry on an electrical contractor-dealer business. They have an up-to-date stock of electrical equipment and supplies.

Oshawa, Ont.

Messrs Furdy Co., 82 Simcoe St. S., Oshawa, Ont., has secured the electrical contract on ten residences to be erect-

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The Erie Electrical Equipment Co., of Johnstown, Pa., announce that S. R. Burd has been appointed acting sales manager for the company, to succeed H. A. Selah. The company was referred to in error in our issue of April 1 as The Electrical Equipment Company.

Electrical News
Generation, Transmission and Application of Electricity

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The Hardware Store as a Sales Medium for Electrical Appliances

A hardware contemporary, writing on the subject of hardware merchants handling electrical goods, has some interesting things to say regarding the merchandising ability of electrical dealers, and incidentally points out some characteristics that may not be palatable but which, at the same time, it may well be advisable that electrical merchants should take to heart.

The article in question points out that "this question has been discussed and haggled over by electrical dealers for years—while hardware merchants are doing the selling." This is a good hint and it should spur us on to work harder. Another statement is that it is a "question of the survival of the fittest between electrical contractor-dealers and hardware men." Still another, that owing to the "numerous jibes at the hardware trade" communication with the electrical manufacturing interests, through the medium of the Ontario Retail Hardware Association, is being made.

All this is interesting and helpful. The last quotation indicates that electrical manufacturers are not finding the hardware store as satisfactory a medium as formerly, or as they expected, and are withholding patronage. This is a foregone conclusion, of course, but it is happening sooner than most of us expected. The fact is that electrical manufacturers nevers seriously considered using the hardware store as a **permanent** sales medium. It has been mutually satisfactory to do so temporarily—while the electrical merchant was getting his second wind, so to speak—but for an ultimate outlet for his merchandise it is safe to say, we believe, that such a thing was never contemplated by the electrical manufacturer. Our contemporary hits the nail on the head when he says "survival of the fittest." Everybody admits that the out-and-out electric merchant, when he becomes efficient, is the "fittest" medium through which to sell electrical goods. The industry realizes his problem, and wonderful progress is being made. Already two or more good stores are to be found where a year or two ago there was one poor one—and we've only begun.

No one disputes the possibility of hardware stores selling electrical goods, or clothing, candy, haberdashery, millinery or groceries. However, it doesn't work out in the latter cases, apparently, and neither can they make a success of the electrical business. Why? They don't understand it, that is all. The average hardware man never will understand the electrical business, or the terms, or the principles underlying the installation and operation of electrical equipment and appliances. There will doubtless be cases where hardware stores will maintain an electrical department and keep a skilled man to look after it—that, in the smaller towns especially, may well be feasible and desirable—but where real electrical stores are available it is as logical that the electrical business should go to them as that watch repairs should go to a watchmaker—rather than a blacksmith.

* * *

Another statement in this article is that "hardware merchants are top-notchers in merchandising." If the word "hardware" were added after "merchandising," we could heartily agree. We believe hardware men are excellent merchandisers; they have had generations of experience. They are shrewd too. Realizing the attractive appearance of electric goods and the glamour that surrounds anything connected with electricity—in the public mind—they were quick to see the value of these goods as a shop front for their own rather unattractive stock. That is the end of the interest most hardware merchants take in electrical equipment, however. They are not good electrical merchants. They have no sympathy with the electrical industry. They don't understand the uses of the goods they sell. They are unable to arouse enthusiasm in their customers over their electric purchases. They are poorly equipped to give service. In a word, they are a make-shift as electrical merchandisers and are merely used because they seem to promise better results, temporarily, than the drug, millinery or grocery store, so filling up the interval while we are developing real electrical merchants. The "fitness" of the trained electrical man, who specializes in electrical matters, cannot be questioned by comparison.

* * *

The article concludes with the sentence: "The policy of 'the survival of the fittest' is quite acceptable to the hardware trade of Canada."

That is the proper spirit. They are making hay while the sun shines, realizing that it can't shine all the time. Perhaps by the time the electrical merchandising trade gets on its feet some other attractive form of merchandise will have been developed to help the hardware man dress up his windows. We sincerely hope so.

But the lesson running through all of this is plain for the electrical industry. The essence of the whole matter is **speed.** Hardware stores, with the best of intentions, cannot merchandise electrical goods. The only solution is the establishment of good electric stores, manned by efficient merchandisers, in every city and town in Canada. We're getting on, but we're going too slow. The larger cities have some fine electric stores but we're lacking in the smaller places. A case in point is a town of 4,000 inhabitants where the only "electric store" in the place has one of its windows filled with bicycles and the other with motor accessories, tools, etc. The only indication, either inside or outside, of it's being an electric store is a cardboard sign about a foot square with the name on it "Blank Electric Company." Who ever heard of a hardware store in a town of 4,000 occupying a dirty back corner in a motor repair shop? Not in the last 1,000 years, at least. It is up to the electrical industry as a whole to remedy these conditions without delay, if for no other reason than that the people are being deprived of conveniences and service they have a perfect right to in this modern age.

Cater to the Large Contracts But Don't Forget the Small Ones

An interesting letter has just been received from the West, commenting on our Prairie Number. The comments are complimentary and refer particularly to the value of the opinions expressed by the various branches of the trade, as the outstanding feature. The letter also points out, however, that these opinions are confined almost entirely to dealers who handle large contracts, operate with a large staff and do things, in general, in a big way.

Our correspondent goes on to say that there is another section of the retail branch of the industry that, in the bulk, contributes largely in buying power, and where the conditions are not very satisfactory. He refers to the contractor-dealers in the small towns and the small dealer in the larger towns. He speaks more particularly of the matter of quantity discounts, which the manufacturers and jobbers are reluctant to change even though the account may be one where discounts for cash are accepted.

Two large sales campaigns are cited as illustrations. The larger retailers with a known turnover find these sales advantageous, whereas the small dealer finds himself, after the sales campaign is over, with a considerable percentage of his stock still unsold. The hardware man immediately attaches a reduced price tag and, until his stock is all gone, makes it impossible for the electrical merchant to compete in price, thus giving the electric shop a black eye.

Another matter brought out is the difficulty encountered in handling devices where the resale price is advertised. Carrying charges to isolated points eat into the profits to such an extent that the margin is so small as to prohibit any profit by the merchant who studies his turnover and his costs.

The letter also again attacks the problem of manufacturers and jobbers selling direct to consumers and quotes particulars of a fan sale, showing that the customer had been supplied at a lower price, actually, than that quoted to the dealer. The letter concludes:

"In view of the greater sales of lamps and appliances by the smaller stores,—business which the jobbers cannot handle in any other way, would it not be playing the game if they would put these sales through legitimate channels, without undue checks on the quotation I refer particularly to the matter of fans, with their approximate 5 per cent. discount.

" As organization of the trade in general cannot, in my opinion, be consumated for a number of years, chiefly owing to what has been termed "Back-door members;" i.e., men who don't realize the term "costs", there seems to be no other way for the dealer than that of pushing the most popular priced line, of admittedly less quality, but with higher margin. This is unfortunate, as the cheap device, with its comparatively short life, will always be a deterrent to the industry instead of raising the standard, which we all so much desire."

There is no doubt that the problem of the small merchant is a difficult one. He does not appeal to the manufacturer and wholesaler on account of his limited purchasing power. In the end, however, will the industry not be farther ahead by co-operating in every reasonable way with the small dealer, helping him to compete with the hardware man, protecting him so that he may make a living margin and educating him so that he may grow into a bigger and better merchandiser?

Distribution Practice in a Sister Colony

It is always of interest to know how our sister colonies are carrying on electrically, even though we may not be willing to admit that their methods are better than ours. Mr. F. A. Cambridge, city electrician of Winnipeg, Man., forwards us a letter just received from the manager of the Electricity Department of Christchurch, N. Z. Mr. Cambridge had explained to Mr. Hitchcock, in a previous letter, the scheme of electrical distribution which has been more or less standardized in Canada, and the reply, which outlines the New Zealand scheme, is very interesting, indeed. · It runs in part as follows:

"I note the voltage and method of your distribution system. Also your remarks covering the increased danger in choosing a higher voltage. Possibly I did not make the position quite clear in my letter. The New Zealand Government, some six or seven years ago, adopted, as standard low tension distribution, the three phase 4-wire method, having 400 volts between phases, and 230 volts between phase and earthed neutral. This system is now extensively installed both in Christchurch and in other cities, and has given excellent results, while the dangers you speak of as possible have certainly not eventuated in practice. The ability of manufacturers to produce electrical appliances wound for 230 volts, and the general education of the public to take care in using electrical apparatus, have undoubtedly made the 230 volt apparatus safe here. What is not realized by engineers using the 110/220 volt distribution, is the very great saving in distribution at 400 volts. In this city, we have no pole transformers—owing to the fact that, for ordinary domestic supply, 400 volt distribution enables us to have our transformer groups up to a mile or two miles apart. The transformer installations are erected in substations of substantial capacity, and are all served by a ring main system of 11,000 volt underground cable. In many houses, two or even three phases, with the neutral, are led in through conduit to the distribution board, and no trouble in this connection has ever been experienced. Whether the service to a residence be single phase, two or three phase, each phase is fused on the outside of the house with a porcelain plug fuse, thus fully protecting the leads between the entrance and the house service panel.

"Where more than one phase is to be led to a cooking outfit, no flex is used, conduit wiring being carried right up to the terminals of the apparatus. The risk of the 400 volt potential difference in a flex does not, therefore, arise.

"For a similar reason, the question you raise regarding switches does not occur, no 400 volt switching being done. All the elements are wound for 230 volts; all the switching and control is done at 230 volts. The only point raised is that the two phases are led into the same apparatus, which gives rise to a potential difference between different parts of the equipment of 400 volts. All the smaller classes of apparatus, such as toasters, irons, grill-stoves, hot plates, immersion heaters, kettles, coffee percolators and the innumerable types of small equipment now on the market, are already in use extensively here at 230 volts and are perfectly satisfactory."

Messrs. Peter & Sylvester, Stratford, Ont., have secured the contract for electrical work on a $42,000 addition being built to the Birmingham St. school, Stratford.

Federal Approval of Electrical Appliances

Brantford, Ont.

Editor Electrical News,

I have noted with a great deal of interest the comments in recent issues of your paper, suggesting the need and advisability of Federal inspection and approval of electrical appliances, and it appears to me that the organized electrical interests in Canada, could not devote energy to a better cause than the support of Federal inspection very much along the lines suggested.

While we are favored by living in a country where the purchasing public are enthusiastic regarding the uses of electrical appliances, and while we are attaining splendid results by organization, let us not lose sight of an issue of such benefit as properly constituted Federal inspection. Under present competitive conditions there is liable to be a tendency toward price cutting at the expense of the appearance, durability, and efficiency of the article. Such a condition if allowed to continue, unchecked, will result eventually in a growing scrapheap of electrical appliances, and beneath them will be buried much of the consumer's good-will that the industry cannot afford to lose. Therefore it appears to me that not only should a device be subject to criticism from the standpoint of life and fire hazard, but that the material used, the standard of workmanship, durability, and the general efficiency of design, are outstanding features which should receive more earnest consideration, if we are going to safeguard the friendly attitude of the public, on which the success of our industry is based.

Regarding local inspection and its bearing on electrical appliances, it is quite true that manufacturers are often asked to make expensive alterations to meet inspection at one point, while at some other point the same alterations are not acceptable. The impression conveyed to the mind of the buyer, moving between these points, does not tend to his support of the particular appliance, and instead of the confidence resulting from uniform inspection, he entertains an element of doubt and uncertainty, which is not conductive to the welfare of the industry. While it is admitted that many useful suggestions are received from local inspectors, there are instances where meeting some of their requirements would result in seriously impairing the life and efficiency of the product, with the result that the manufacturer either passes up that territory, or refuses to meet the requirements, thereby often incurring the non-support of the inspector, which is not the condition of important harmony suggested by uniform Federal inspection.

Yours truly
J. A. McDonald

Manitoba Power Co.'s Development

On April 27th. Mr. T. W. MacKay, assistant chief engineer of the Manitoba Power Company Limited, gave a very interesting talk before the Manitoba Electrical Association at the bi-monthly luncheon in Manitoba Hall, on the new hydro-electric development on the Winnipeg River at present under construction by his company.

In the course of his talk Mr. MacKay drew the attention of the members to the wonderful asset which Manitoba enjoys in the Winnipeg River, as a source of cheap and abundant water power and described the river and its drainage basin in detail, with special reference to the control of the discharge of the river by the Water Power Branch of the Dominion Government.

Reference was then made to the salient features of the new development, during which the method of construction being followed was very concisely explained. Attention was also drawn to the immense quantities of material involved in the work and the procedure for handling the same.

Mr. MacKay also touched on the period of financing the project, which extended from 1914 to 1921, when arrangements were finally completed, and stated that great credit was due to the vice-president and general manager of the company, Mr. A. W. McLimont, for the successful completion of this difficult task.

In closing, reference was made to the benefits accruing to the electrical industry from the new development, not only from the standpoint of materials required for construction, but also on account of the immense quantities of appliances and equipment which will be required by consumers when the plant is in operation.

Industrial Lighting Campaign

Owing to various causes, principal of which was the late date at which the new display headquarters of the B. C. Manufacturers Association was ready for occupation, the proposed Industrial Lighting Campaign, which has been prepared by the electrical industry in Vancouver, will be postponed until later in the year. It is possible that August or September will see the exhibit staged and the campaign begun. It is intended to be educative for the factory, shop and mill owner, instructing him in the real saving effected in cost of operation and production by correct lighting. The actual saving possible in the monthly light bill by the use of improved methods and appliances will also be shown in the campaign of demonstration.

A Correction

In an article entitled "The Power Resources of the Prairies," which appeared on page 84 of our April 15 issue of the Electrical News the first two lines of the fourth paragraph read "The province possesses available water power to the extent of 475,000 h.p. for maximum commercial development."

This should have read "The province possesses available water power to the extent of 475,000 h.p. at ordinary minimum flow and 1,138,000 h.p. for maximum commercial development."

R. N. Dicer, Electrical Contractor, 1256 Pender St., W., Vancouver, has been awarded the contract for the electrical work on the new electric bakery being erected by Shelly Bros., Vancouver.

Coming Conventions

National Electric Light Association, at Atlantic City, N. J., May 15-16-17-18-19.

Canadian Electric Railway Association, at the Drill Hall, Quebec City, Que., June 1-2-3.

Canadian Electrical Association, at the Chateau Laurier, Ottawa, June 15-16-17.

Association of Municipal Electrical Utilities, at the Clifton Hotel, Niagara Falls, Ont., June 22-23-24.

American Institute of Electrical Engineers, at the Clifton Hotel, Niagara Falls, Ont., June 26 to 30.

Problems of the Industrial Engineer—II

Explaining the Effects of Low Power-Factor to the General Manager

By GEO. L. MACLEAN, E.E.
Electrical Engineer Canadian Connecticut Cotton Mills Ltd., Sherbrooke, Que.

"How's the world hitting you?" enquired the General Manager of the Electrical Engineer, as he strolled into the office one afternoon just as the engineer was in the middle of a transmission line problem. "Not too bad," replied the Engineer. "Lay off a while," said the G. M., "and explain to me as simply as possible how we can correct this low power-factor condition? What does this low p.f. do anyway besides making us pay out money for nothing? Does it affect our plant materially, I mean, and injure our electrical equipment?" "Yes," replied the engineer, "its disadvantages are many."

"Although the wattless current"—"What's that, wattless current?" "The watt," replied the Engineer, "is the product of volts multiplied by amperes. 100 volts of direct current times 10 amperes equals 1,000 watts, or one kilowatt, but in an alternating current of three phase (such as we use) 100 volts times ten amperes times $\sqrt{3}=1.730$ kilovolt amperes. Then 1.730 kilovolt amperes times our power-factor (.75) equals 1,297 watts or 1.297 kilowatts. The effective difference between 1.73 and 1.29 is our wattless or idle current, a current that has no component part, being out of phase. Although it puts very little load on our system the heating effect is the same though it were in phase and a component part. Therefore, it causes heating of our electrical apparatus which in turn causes deterioration of the insulation and consequently motor burn-outs, which keep our expenses up. This low power-factor also causes poor regulation of line voltage, this in turn decreases the torque or turning power of our induction motors and also increases the magnetizing current—or we will call it 'no load current.'

"As an illustration we will say that the low power-factor causes a certain percentage of increase in magnetizing current and we will have to pay for this increase in current, for it is a component part and effective. From this also you can readily see it increases our cost from the power bill end and from the practical end by increasing our maintenance cost.

"I will explain how this low power-factor would affect the first cost of an installation. We are going to install a connected load of 1,000 h.p. of induction motors ranging in size from 10 to 50 h.p. Our connected load factor, or the ratio of employed h.p. to our connected capacity, is 70 per cent, or we will use only 700 h.p. of our 1,000 available h.p. Our p.f. is 75 per cent, we will require transformer capacity of 695 kw., as 700 h.p.=522 kw. and this figure divided by .75 (our power-factor) equals 695 kw. These figures," explained the Engineer, "are taken offhand, and I am not considering stand and other apparatus.

"But from this explanation you will understand that if we had a power-factor of unity, 100 per cent, or even one of 85 per cent, it would make a great difference. Let us say that we have apparatus to allow us to bring our power-factor to 100 per cent, and that it will pay us to install this equipment,—then we would install a transformer bank of 522 kw. capacity. Our first cost of installation would be reduced by the difference between the cost of a 695 kw. capacity bank of transformers and a bank of 522 kw.

"Also, suppose we have a bank of 600 kv.a. transformers and our power-factor is 75 per cent,—then we will have a capacity of 450 kw. or 603 h.p. We are now running these transformers full load and would have to enlarge our plant to increase production. We desire to make such changes as would require 400 h.p. more. Our 600 kv.a. bank of transformers is not large enough, so we, instead of buying new transformers, install apparatus to bring our power-factor up, getting two results in one installation, viz; cutting out the power factor penalty and saving the cost of another bank of 400 kv.a. transformers.

"Could we not overload our transformers a little?" asked the G. M. "Yes, but it is poor policy to take chances, although there are instances where transformers are run at high temperatures over long periods. Manufacturers, however, do not recommend that practice. Without your transformers or spare ones, you would lose more in production than would be gained. It is a case of 'Penny wise and pound foolish.'

"Another point in connection with this," said the Engineer, "is that at unity power-factor your transmission line copper would be cut down considerably as low power-factor plays an important part in line calculation."

"You have taken up so much time explaining the evils of low power-factor," said the G. M. as he looked at his watch, "that I have not time now to learn how we can eliminate it, but I am glad for the explanation of its evils and at the first opportunity we will discuss how to get an ideal condition, or what was it? 'Unity Power-Factor,' said the G. M. as he bid the Engineer "Good afternoon."

Radiophone Sales Campaign in Vancouver

The electrical industry in Vancouver is making every effort to handle the radiophone equipment business properly. In an effort to stabilize the sale of materials, sets and parts for radio installations, a radio campaign has been set on foot, encouraged by leading manufacturers, jobbers and the potential distributors, the contractor-dealers. As the result of a preliminary meeting held at the call of Mr. Rey E. Chatfield, secretary manager of the Electric Service League, when the situation was canvassed from all angles, a decision was reached to put on a short course of educative addresses to the salesmen employed by electrical dealers.

While it was agreed that it was certainly most desirable to sell all radio equipment through the established trade, the fact that it was new to most of the salesmen made it necessary to provide them with ample knowledge to sell intelligently. The only way then to control this business was through people who knew how to sell the equipment. For the first course, three lectures were arranged. The dates set were Tuesday, April 25th, Thursday, April 27th and Tuesday, May 2nd. For the first address, Mr. L. Mayne, radio engineer for the Marconi Wireless Telegraph of Canada. The second was to be supplied by a member of the staff of Canadian Radio Services, Ltd., and the third by the representative of C. B. Harrison & Co., agents for radio manufacturers. Merchandising phrases, description of suitable apparatus, and methods of explaining to customers apparatus suited to their requirements or desires, were to be covered in the course. It is possible that later an extended course will be given.

So interesting is the radio equipment trade becoming that it is now the intention of the electrical industry to put on a co-operative advertising campaign for the merchandising of radio sets and supplies. In this connection it is pointed out that cheap sets are being stocked and sold by department stores in the city, and that other dealers outside the electrical trade are making plans to cut in also.

Flat Rate Operation of Water Heaters

Lower Wattages Give Satisfaction—An Analysis of Heater Performance Under Test

By J. A. McDONALD
Manager Thermo Electric Ltd., Brantford.

The evidence of the customer who enjoys and the central station that supports a flat rate, as applied to domestic electric water heaters, seems to point to the fact that this method meets requirements to the satisfaction of the parties concerned. Heaters of this class depend for their success on continuous operation, and a reasonable period in which there is no demand for hot water, which is usually furnished by the night run. Therefore the time element does not enter into discussion, but the required wattage to successfully meet the requirements of the majority of customers is important. Considering the input in watts at which these heaters should operate, the diversity in hot water demand, and the variation in sizes of domestic boilers, there has not been a standard wattage that would meet requirements within a safe margin and eliminate unnecessary waste of energy. Because of these conditions it has been found advisable to adopt a certain degree of flexibility in the wattages of heaters for this purpose. While it is true that domestic boilers vary in capacity from 15 to 40 gallons, and even higher, the greater majority are between 30 and 40 gallons, the 30 gallon size being enough in evidence to regard it as standard for any ordinary domestic installation.

Satisfactory Wattages

For boilers varying from 30 to 40 gallon capacity satisfactory wattages seem to vary from 700 to 1,000. It has not been found advisable to recommend heaters of lower wattage than 700 for boilers of 30 gallons, except in cases where the demand for hot water is exceptionally low, when 600 watts may meet requirements. Experiments conducted under field conditions have shown that it is advisable to keep the boiler at a temperature above 140 degrees, and preferably at 160 degrees, the latter requiring the addition of almost 50 per cent cold water before it can be used with comfort. Heaters of lower capacity than 700 watts do not seem able to take care of radiation and hot water demand, and maintain a satisfactory 30 gallon boiler temperature.

The 1,000 watt heater can be recommended for boilers of 30 gallon capacity where the demand appears excessive, and boilers under ordinary demand, upward of, and including, 40 gallon. One of the leading Canadian central stations that has several hundred 1,000 watt heaters operating continuously advises that this size gives excellent service on 40 gallon boilers, for with this size of boiler the reserve in volume of hot water is able to take care of a greater demand than the 30 gallon boiler will allow, thereby giving to the customer a greater volume of delivered hot water without additional expenditure of energy.

Because heaters operating continuously give instantaneous hot water, once they have the boiler heated, the time taken in heating needs no consideration. Next to the proper wattage, the important issue for the customer to ascertain as nearly as possible is the number of gallons of hot water that heaters of accepted capacity will deliver. While it is admitted that few customers have any idea of the actual gallons of hot water used in their households, the fact of having before them the number of gallons delivered will afford them an opportunity to judge their requirements fairly closely by comparison.

Service Gallons

Only in exceptional cases can the hands be placed in water at a temperature of 115 degrees Fahrenheit. Owing to the boiler temperature being usually higher than this it is necessary to add cold water to the water delivered by the boiler before it can be used with comfort. This addition of water naturally increases the volume of water used, but does not take this increase from the boiler. This increased volume of water we will call service gallons, so that the number of gallons delivered by the boiler, and the number of gallons available for use may be distinguished.

Purpose of the Chart

It must not be assumed that the chart is intended to represent actual domestic demand. Its exact purpose it to give fairly reliable information regarding the maximum number of gallons that heaters of the capacity designated will supply, the variation in boiler temperature in relation to hot water demand, and a comparison of the performances of the two heaters. These heaters were both of the immersion type and were installed in the 1" opening in the side of the boiler, commonly used for connection to the furnace coil. Owing to the fact that this opening is placed about one-third the distance from the bottom to the top of the boiler, it can be roughly stated that the heaters are heating directly only 20 gallons of water, and indirectly, 10 gallons. The test was made with exposed boilers, operating under ordinary field conditions, and covered a run of two days and two nights, the demand period being confined to the hours from 7 a.m. to 6 p.m.

The table below the chart shows the hot water gallons delivered and the consequent service gallons, the service gallon temperature being not less than 110 degrees. The full lines represent both the room and boiler temperature during the 1,000 watt run, and the dotted lines similar temperatures for the 700 watt heater.

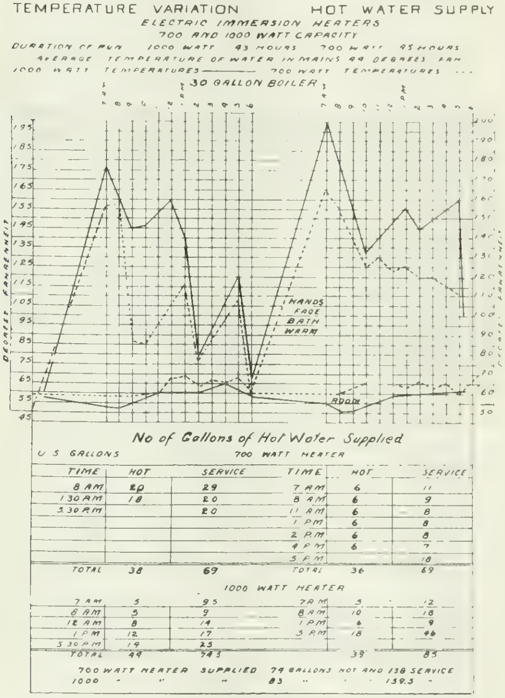
Heater Performance Analyzed

The 700 watt heater starts with a temperature of 46 degrees the evening preceding the first day. At 7 a.m. the following morning a boiler temperature of 155 degrees is reached. Referring to the table below we find the temperature drop starting at 8 a.m., due to the withdrawal of 20 gallons of hot water from the boiler. In order that this quantity may be comfortably used, 9 gallons of cold water are added, resulting in 29 service gallons. The chilling effect of the 20 gallons of cold water results in a temperature of 85 deg. at 10 a.m., when the temperature starts to rise and at 1 p.m. reaches a temperature of 115 deg., when 18 gallons are drawn off, which on account of their low temperature require the addition of only two gallons of cold water. The boiler is again chilled to 77 degrees but rises to 108 degrees at 5 p.m., when 20 gallons are delivered.

Starting at 60 degrees, or room temperature, at the end of the first day's demand, a temperature of 165 degrees is reached at 7 a.m. the following morning. The higher temperature reached on the morning of the second day is due to the higher starting temperature the night before. It should be mentioned here that the rate of rise as shown on the no demand period on the chart does not represent the true rate of rise of the heaters. The actual rate of rise becomes less as the temperature increases. The lines of temperature rise in the no demand period are not intended to show the actual performance of the heaters but merely the existence of the no demand period and the different temperatures arrived at.

Starting at 7 a.m. with a boiler temperature of 165 degrees, 6 gallons of hot water are drawn, which at this temperature are equivalent to 11 service gallons. At 8 a.m. an equal amount at 155 degrees is delivered, and the effect of the replacing 12 gallons of water is seen in the falling temperature until 10 a.m., when it again rises, reaching 130 degrees at 11 a.m. Here six gallons are again drawn, resulting in a falling temperature. A temperature of 125 degrees is reached at 1 p.m., when another 6 gallons is delivered. The withdrawal of similar amounts at 2 and 4 p.m. brings down the temperature to 115 degrees at 5 p.m. At this point the heater has delivered an amount of hot water only two gallons less that that delivered on the first day, and the greater part at a higher temperature. Also, there are 18 gallons at service temperature still in the boiler.

Owing to the fact that the foregoing explanation of the action of the 700 watt heater will assist in understanding the performance of the 1,000 watt heater, it will not be necessary to follow its table and the resultant temperature variations. It is natural that the temperature rise should be both higher and faster than in the case of the 700 watt heater, even considering the fact that it operates two hours less and at a lower room temperature for the entire run. The advantage of high temperature is evidenced by the fact that at 5 p.m. of the second day's run of the 1,000 watt heater, 46 gallons are available at service temperature.



No of Gallons of Hot Water Supplied

U S GALLONS

700 WATT HEATER

TIME	HOT	SERVICE	TIME	HOT	SERVICE
8 AM	20	29	7 AM	6	11
1 30 AM	18	20	8 AM	6	9
3.30 P.M		20	11 AM	6	8
			1 PM	6	8
			2 P.M	6	8
			4 P M	6	7
			5 P M		18
TOTAL	38	69	TOTAL	36	69

1000 WATT HEATER

TIME	HOT	SERVICE	TIME	HOT	SERVICE
7 AM	5	9 5	7A M	5	12
8 AM	5	9	8 AM	10	18
12 AM	8	14	1 PM	6	9
1 PM	12	17	3 P.M	18	46
5 30 P M	19	25			
TOTAL	49	74 5		39	85

700 WATT HEATER SUPPLIED 79 GALLONS HOT AND 138 SERVICE
1000 " " " 83 " " " 139.5 "

Graphic results of tests on **1000** and **700** watt heaters

Radiation

The action of the factor of radiation is clearly evident in the rate of temperature rise of the heaters at different boiler temperatures. Noting the rate of temperature rise between 2 and 5 p.m. on the first day of the 1,000 watt run, when an advance is made from 80 to 120 degrees, it will be seen that it is noticeably fast. Comparing this with the rate of the same heater at the same time on the second day it is apparent that it is much slower while the operating temperature is between 145 and 160 degrees. This difference is due to the increase in the rate of radiation at higher temperatures. Comparing the rate of rise of the two heaters at the same boiler temperature, the rise of the 700 watt heater from 7 to 8 a.m. on the first day and that of the 1,000 watt heater from 4 to 5 p.m. on the second day, it will be clear that the 700 watt curve is soon due to flatten out, while the 1,000 watt still maintains a satisfactory rise. This is of course suggestive of the reason for the unsatisfactory service of lower wattage heaters, which may be summed up in the fact that there is not enough energy to overcome radiation at water temperatures sufficiently high to give the customer satisfactory service.

Diversified Demand

For further purposes of comparison it may be noted that the two heaters show four different daily demands. On the first day the 700 watt heater is called upon to supply the maximum demand early in the day, and the 1,000 watt heater supplies a minimum demand in the morning and a steadily increasing demand as the day passes. During the second day, the 700 watt heater is filling a demand of smaller quantities at more frequent intervals, and the 1,000 watt heater supplies a heavy demand in the morning and late afternoon and a light demand in the middle of the day.

Conclusion

Those who become familiar for the first time with the actual quantity of water that can be supplied by a continuous operating low wattage heater, usually express surprise that the volume secured is much greater than they anticipated. Heaters of proper wattage for their individual boilers appear able to deliver per day a quantity of hot water equal to the capacity of the boiler, and in service gallons a quantity easily twice the boiler capacity, depending of course upon the temperature at which the boiler is operated. There does not seem to be even the remotest possibility of the adoption of a standard rule that will reasonably apply to the hot water requirements of the majority of customers. Two households with apparent similar conditions often differ widely in their hot water demand, and households where the demand appears to be excessive often use less than those where the reverse is suggested. So far the problem of the correct recommendation of wattages, for water heaters, to meet any definite requirement in the domestic field, remains unsolved. While it will always be a matter difficult of exact solution, it is safe to assume that when the product is in more general use, and dealers and public become better acquainted with its performance, many phases of the problem will become adjusted. Heaters of the capacity described are giving satisfactory service in boilers of the capacity recommended, and while the chart shows maximum quantities, careful measurement of domestic installations show that such demands are rarely if ever reached, and that the average seems to be between 40 per cent and 60 per cent, occasionally reaching 75 per cent.

The United Electric Supply Co.

Mr. I. Herbert, who has been carrying on an electrical contracting business with headquarters at 46 Cameron St., Toronto, has now become associated with Mr. A. Fralich and formed the United Electric Supply Company, to carry on a general wholesale distributing business in fixtures, appliances, radio apparatus, etc. The building at 300 College St., Toronto, is being remodelled for the new company's purposes and will be opened for business about May 15.

Prominent Consulting Electrical Engineer Heads Dominion Alloy Steel Corporation

Members of the electrical industry will be interested in noting the appointment of W. B. Boyd, M.I.E.E., as president of the Dominion Alloy Steel Corporation, Ltd., of Sarnia, Ont. Mr. Boyd is well known. He was born in Markham, in the county of York, Ontario, fifty years ago and after attending Collegiate there entered the Armour Institute of Technology, Chicago. He was only 19 years old when he was placed in charge of the electrical installation of a number of the buildings at the World's Columbian Exposition, in Chicago, and later became chief electrician in charge of lighting and power, as long as the Exposition remained open. For a time he was electrical and mechanical engineer with the Westinghouse Electrical & Mfg. Company. From there he became assistant chief electrical engineer of the Illinois Steel Company and in 1901, was appointed chief electrical engineer of the Dominion Iron & Steel Company. He became associated, in 1906, with a number of companies in which Sir William Mackenzie was interested, and held a number of important positions, including that of chief engineer to the Toronto Railway Company; chief engineer to the Electrical Development Company; also to the Toronto & Niagara Power Company and the Toronto Electric Light Company. He still holds the office of chief electrical engineer of the Toronto & York Radial Railway Company and the Sudbury-Copper Cliff Suburban Electric Railway Company. In later years Mr. Boyd has confined his attentions chiefly to consulting work, more particularly in connection with such important industrial concerns as the Howard Smith Paper Mills, the Maple Leaf Milling Company, etc. He is also consulting electrical engineer for the Ontario Railway & Municipal Board. He is a member of the Electrical Section of the Canadian Engineering Standards Association and of the Institution of Electrical Engineers of England.

W. B. Boyd, M.I.E.E.
President Dominion Alloy Steel Co

Associated with Mr. Boyd are a number of well-known men on the Board, including Sir William Mackenzie; H. R. Jones, formerly president of the Alloy Steel Corporation; Geo. A. Simpson, formerly sales manager of the Steel Company of Canada; C. H. Wills formerly chief engineer of the Ford Motor Company; W. A. Black, president of the Ogilvie Flour Mills, Ltd., and vice-president of the Kaministiquia Power Company; B. H. McCreath; J. J. Mahon and Col. William McBain.

The new Company plans to commence building operations in about two months. The contract will be let in the meantime for the new plant. This plant will be entirely self-contained and will contain two 75 ton open-hearth furnaces as well as a 20 ton and a 6 ton electric furnace; also rolling mill, blooming mill, sheet mill, etc., and ultimately, though not immediately, a blast furnace. The capacity planned within the near future is 100,000 tons annually of alloy steel, such as is used in the manufacture of automobiles, tools, farm implements, etc. The initial demand for power is estimated at 15,000 h. p. This will be supplied by the Hydro-electric Power Commission of Ontario.

This is the first plant of its kind to be established in Canada. The imports of alloy steel have now reached the annual amount of 100,000 tons. Most of this is used in the Sarnia district, and the new company anticipate that within 60 miles of their plant there will be a demand equivalent to their total output. It is indeed gratifying to note the prominent part taken by electrical men and electrical energy in establishing this very important industry.

Electric Club of Toronto Annual

At the annual meeting of the Electric Club of Toronto, held on Wednesday, April 26, the treasurer's report showed a satisfactory surplus on hand and the report of the secretary indicated that the attendance during the past season had been the largest in the history of the Club—well over a hundred, on an average. The following officers were elected for the year 1922-23: President, E. M. Ashworth; vice-president, S. L. B. Lines; secretary, T. R. C. Flint; treasurer, R. A. L. Gray. Executive: F. Jno. Bell; W. A. Bucke; H. A. Cooch; Geo. Hogarth; R. T. Jeffrey; Frank Kennedy; Geo. Paton; L. P. Stiles and E. B. Walker.

Big Discrepancy in Bid Prices

The electrical contract for the Chemistry Building, University of Saskatchewan, at Saskatoon, Sask., was recently let to the Wheaton Electric Co. of that city for $20,930. The bids tendered for this work ran as follows: $32,100; $32,000; $30,000; $26,975; $25,850; $22,470; and $20,930. As we have repeatedly pointed out, there is too great a discrepancy in the bids of electrical contractors—a difference existing, in this case of $11,170. between the highest and lowest tender, or a percentage of 35. This compares with a difference of $36,097.45 in the tenders of the plumbing and heating trade (with an expenditure approximately eight times that of the electrical) or a percentage of 19. The general contract tenders varied only by $34,905. between the highest and lowest bids, representing a discrepancy of 7.5 per cent.

Who Said Electric Homes are Only for Large Cities?

In the account of the One Man Electric Home given elsewhere, a noteworthy fact is the low cost of the whole exhibit, $150.00. This proves that any dealer can put on an Electric Home—any man who is sold on the electrical idea himself and who is willing to devote to the matter a little energy and brain power. It is necessary to secure the cooperation of a builder and a furniture dealer, but this can be done by explaining to them the advertising value of such a display. There should be an Electric Home in every town in Canada this year.

Messrs. Chipman & Power, consulting and supervising engineers, Toronto, have been retained by the town of Oakville, Ont., to make a report on a suitable auxiliary for operating the water pumps in the event of a tie-up in Niagara power. A capacity of approximately 300 h.p. will be required, which will be a single unit engine, either gasoline or Diesel type.

Merchandising Appliances and Supplies

Give Dealers a Reasonable "Spread"—Leave Appliances on Trial—Allow Extended Terms of Payment to the Customer —"Sell" Ourselves first—Use Manufacturers' Helps.

By GEO. R. ATCHISON*
Merchandise Manager Southern Canada Power Co.

In making up this paper on the merchandising of electrical appliances and supplies, I have not attempted to deal, in any great detail with the figures involved in the potential possibilities, but rather with some of the present problems that confront us, which must be solved if growth is to be hastened.

The Sale of Appliances

First, dealing with the sale of appliances:—with the exception of the flat iron, the idea must be sold and the demand created before the sale can be effected. This practically brings the sale of electrical appliances into the "Specialty Class," such as pianos, cash registers, adding machines, etc. It would hardly seem that this fact is recognized by the trade in general. The selling of specialties is expensive and requires a competent organization to handle. An outside soliciting staff is required to whom a liberal compensation must be paid, if the right type of man is to be attracted to the line. An expense of 10% can be figured on for outside solicitors alone, and in some cases this may run as high as 15%. When this initial expense is added to the regular expenses incurred in connection with the upkeep of an electrical store, it has been found that an average overhead of 26% on the selling price is a fair figure. When it is considered that a discount of 25/10% on electrical appliance purchases is that generally allowed to the dealer, it can be seen that there is very little margin left for profit, contingencies, or building up of a reserve to take care of any depression. We can, therefore, hardly hope to attract many dealers to the merchandizing of electrical appliances, until a more liberal schedule of discounts is put into effect by manufacturers and jobbers, particularly as the stock turnover in this line is not very rapid, four times per year being considered good. As an illustration of this let us take a fan, a 16 inch oscillating fan selling for $44.00, costing the dealer $33.00, to which must be added the sales tax, bringing the cost close to $34.00, and where the dealer has to pay transportation charges, the cost will be approximately $35.00. Figuring his cost of doing business at 26%, the total cost of the fan, including the selling expenses stands at about $46.00, resulting in an actual loss of $2.00, on each sale. When it is further considered that fans are somewhat of a "gamble" in this district, it can readily be understood that there is not much incentive to carry a stock of them.

Let us take another article, such as a washing machine retailing at $170.00. The invoice cost to the dealer will average $136.00, to which must be added sales tax, bringing cost up to $138,00, and when he dealer has transportation charges to pay, the cost will average $143.00 laid down in the store. To this cost must be also added the following; salesman's commission at 10%, $17.00; cartage and time of helper delivering machine to prospect's house $2.50, making a direct cost of $162.50, which leaves a margin of $7.50 to take care of other expenses, and any service calls required on the machine during the guarantee period, and this, mark you, without taking into consideration the compensation to which the dealer is entitled. Can, therefore, the dealer hope to build up a profitable business on any such basis?

These are only two examples, but they are practically typical of the electrical appliance business.

Dealer Requires a Large "Spread"

Obviously, then a larger spread must be allowed by manufacturers or jobbers, if this business is to be developed, and the present seems to be an excellent time to put such a policy into effect, when prices on appliances generally are on the downward grade. Where it is not possible for the manufacturer to decrease the list price, for the benefit of the consumer, and increase the spread to the dealer, manufacturers might allow the list price to remain as it is and pass on any benefit of reduction to the dealer in the shape of larger discounts. This is one of the problems which require careful investigation and correction.

How to Sell the Idea

Another problem is that generally speaking Electrical Appliances cannot yet be considered as "over the counter merchandise". The flat iron is the exception to this, and the vacuum cleaner becoming more popular and more easily sold, may also be partially considered as an exception. But, before the sale of many of the other appliances can be effected, the demand must first be created by selling the idea, and the problem is how to sell the idea to the public and stimulate the demand. This can be done in several ways, namely, local newspaper advertising; outside solicitation; attractive window displays; attractive stores; distribution of circulars which are furnished free by the manufacturers, etc., it, being necessary of course, in this section to have all advertising matter both in French and English; store demonstrations; country fairs; and exhibits are known to have good results. Advantage should also be taken of having electrical appliances placed in educational institutions, domestic science schoole, etc., where advantages and conveniences of appliances are learned by the students. These methods of selling the idea and creating the demand are necessarily somewhat slow, and can be measured to some extent by the number of dealers and others aggressively engaged in the merchandizing of appliances. What is needed is something that will help to sell the idea quicker and increase the demand, so that a rapid but substantial growth in the business may take place. When we have thoroughly sold the idea of electrical labor saving devices to the public, and not till then, will we have a busy time taking care of the demand. When merchandizing is properly organized and handled along the lines suggested there must be a very profitable business for all factions in the industry.

Campaign in Local Papers

If a co-operative advertising campaign was instituted principally in the local newspapers to sell the idea of electrical appliances in an educational way, the demand could possibly be stimulated very rapidly. One feature of this campaign might be the reservation of a full page in the newspaper at least once a month for advertising, supplemented by reading matter supplied by the industry and which the newspapers would undoubtedly be glad to insert free of charge. The cost of this campaign could be borne proportionately by the manufacturers, central stations, jobbers and dealers; while in the aggregate this cost would represent a fairly large amount, it would, when divided over those interested, inflict no great hardship on the individual. This campaign should be handled in such a way that no particular manufacturer would endeavor to sell his goods only but that all should group together to sell the idea; say as an example of cleaning rugs, draperies, furniture, etc., with a vacuum cleaner doing away with dirt and dust, making more healthful living conditions, removing the irksome task of using a broom, etc. Electrical range manufacturers could sell the idea of cooking electrically with all its conveniences and advantages; fixture manufacturers, the idea of better lighting; washing machine manufacturers the idea of washing clothes the electrical way, quicker, easier and better. Irons, toasters, grills, etc., could be advertised in the same manner.

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*Before Montreal Section, Canadian Electrical Association

Vacuum cleaner manufacturers have started a co-operative advertising campaign in the United States through the leading newspapers endeavoring to sell the idea of using a vacuum cleaner for cleaning rugs, etc., and abolishing the old fashioned way of cleaning. These "ads" are 12 inches by 7 inches, and I understand will appear at least once a month. There is no mention made in the "ads" of any particular manufacturer or make of cleaner, and in fact the cut of the cleaner has been arranged so that only the handle and bag of the cleaner can be seen. A campaign conducted along these lines here should bring beneficial results.

The Electrical Home is, as we know, very much along the lines of co-operative advertising and should do a great deal towards familiarizing the public with the desirability of wiring their homes properly and with sufficient convenience outlets to use the electrical labor saving appliances to best advantage.

Salesmen Wanted

Another problem we are confronted with is the securing of salesmen to retail electrical appliances. The training of salesmen should have the careful consideration of the industry in general. A salesman handling electrical appliances must be possessed of vision, and be able to present his sales arguments in a convincing manner. He must be prepared to meet with many difficulties in closing sales, and be strong enough to overcome all of these. The compensation paid to electrical salesmen should be sufficient to attract high class type of men. The most satisfactory method of compensation seems to be on a salary and commission basis. Straight commission is frequently used, but this has the disadvantage of the salesman being inclined to feel that his time is his own, and that he may employ it as he thinks best. He is inclined to consider that he is not on the company's pay roll, as a regular member of the staff, and that the same devotion to his work should not be expected of him as is generally given by salaried employees.

Proper Remuneration

At this point I will revert to one of the points in the beginning of my paper regarding the necessity for a greater spread to the dealer between his cost and selling price. As an example, we might take the case of piano sales: pianos in most instances must be regarded as a specialty, and somewhat of a luxury. They sell on the average for say, $400.00. To sell any article of this value must evidently not be a very easy matter. Yet we know that pianos are sold in very large numbers. How is this possible? The piano salesman does not make a sale every day, but when he is successful in placing his wares with a customer, the transaction results in a remuneration to himself sufficient to offset his previous non-success, or times when sales were not forthcoming. Consequently, he is encouraged to keep pegging along, and like the constant dripping of water wearing away the stone, his constant endeavor results in a more or less steady output of pianos.

Could, therefore, the piano dealer continue to have his employment men capable of bringing in a steady volume of orders and conduct the business along the lines he does, unless the spread between the cost price and selling price was sufficient to pay his employees the tempting remuneration required to take care of his expenses, and net him the return he is entitled to. It is, therefore, readily seen that the piano manufacturer helps the piano dealer in no small measure.

Highest Quality Only

It should be the policy of all employed in the merchandising of electrical appliances to sell only such appliances as are of the highest quality, and which will give the purchaser every satisfaction, under proper operating conditions. Appliances which are not up to a reasonable standard of quality should not be handled by any electrical store, as they will act as a boomerang and retard the trade generally. It should be a moral obligation on the part of the dealer due to himself, to the industry and to the purchaser to sell only such appliances as will create satisfied users, who will pass on to their friends their feeling of satisfaction at the advantages and conveniences received by them from the use of electrical labor saving devices in their homes. A satisfied user is one of the best advertisements we can have, and will be the means of helping increase the demand. Many leads can be secured from them that will result in sales. Generally they will only be too pleased to give a list of names of those likely to be interested in their desire to have their friends share in the same advantages and conveniences.

Leave Appliances on Trial

In many instances where the dealer is endeavoring to effect a sale, he must be prepared to place the appliance in the prospect's home on trial, so that the prospect may learn for himself the many advantages and conveniences in the use of the appliance. Generally speaking, if an appliance is placed on trial in the home of a bona fide prospect, the sale is practically made, so that the likelihood of the dealer having left on his hands an appliance depreciated as a result of such demonstration may be considered remote. Demonstration in the prospect's home is probably the best way to secure a sale and should be encouraged to the fullest extent. The salesman making the demonstration should be thoroughly familiar with the appliance and be prepared to answer all questions pertaining to it in an intelligent manner.

Extended Terms of Payment

On the higher priced appliances, such as washing machines, vacuum cleaners, electric ranges, etc., the dealer must be prepared to allow extended terms of payment to the customer if he hopes to make sales in any volume. Payments are usually extended over twelve months, with an initial cash payment on delivery of 10% of the total price. 10% is usually added to the standard list price to cover this accommodation. This addition will take care of interest on money outstanding and allow for extra book-keeping expense. Appliances sold on extended term payments should be covered by a lien form, and in this Province, the landlord must be notified by registered mail that the appliance is the property of the dealer until fully paid for. Where the dealer cannot carry these extended payment sales conveniently, arrangements can be made to have some financing company carry his paper, at a figure not exceeding 10%.

Manufacturers "Helps"

The manufacturers are generally very willing to supply dealers with advertising circulars, and attractive window displays. Every advantage should be taken of this privilege in such a way as to bring results and justify the manufacturers' expense in supplying this free of charge. Circulars can be sent out with the monthly bills, and also enclosed with parcels.

The manufacturers are also generally prepared to supply electros for use in newspaper advertising. This should also be taken advantage of and where possible the dealers' "Ad" should tie in with the manufacturers'. In any event, wherever possible, the distribution of circulars, window displays and newspaper advertising should tie in together, and be further supplemented by special effort on the part of the salesman on the particular appliance being featured.

More Confidence & Co-operation

If we are to develop the business to the extent we hope, we shall have to have more confidence in each other and more co-operation amongst the different factions is necessary. Instead of looking on one another as competitors in the strict sense of the word, we should feel that each and every one is doing his part towards developing the business and that by the law of average, those legitimately entitled will secure their share of business being offered.

Each faction of the industry has a function to perform in the development of the business, and the growth will be helped by a sincere spirit of co-operation throughout. Through co-operation, acquaintances are made, and that confidence established which is so necessary in any business. There should be a bond of understanding between the different factions, the function of each realized and appreciated. The difficulties in the business are not confined to any one particular branch.

The central station is anxious and willing to co-operate towards the development of the business and can be of inestimable value to the other groups. It should be the policy of all engaged in the electrical industry to boost electrical affairs in general and without detriment to any particular faction, whenever possible, so that the public may have confidence in the industry as a whole.

For instance, manufacturers, jobbers and dealers must show their faith in the industry by endeavoring to create good will towards the central station by explaining to the best of their ability the desire of the central station to supply service to the community in a satisfactory manner, explaining, if possible, some of the difficulties which are encountered in so doing.

As the growth of the merchandizing of electrical appliances will largely be measured by the growth of the central station, it obviously is imperative that this spirit of goodwill be fostered to the full. On the other hand, the central station must be prepared to reciprocate with manufacturers, jobbers, dealers and contractors in the solution of their problems and co-operate with them in every manner possible.

Central Stations and Merchandizing

The question has frequently been raised in regard to the central stations conducting a merchandizing business, but there can really be no legitimate objection to this, providing the merchandizing is carried out on a strictly ethical basis. The central station should sell at list prices, and conduct this end of their business on exactly the same basis as a dealer has to do in order to make a profit. When this is done, practical experience has proved that the fact of the central station being in the merchandizing business has, through their aggressive selling and advertising efforts in that territory, stimulated the demand for appliances and wiring which is shared by all. On the other hand, where the central station had dropped out of this end of the business, it has been proved that the dealers' sales have dropped off very materially. There is, therfore, a distinct advantage to the dealer in territories where the central station is in the merchandizing business, conducted in an ethical manner.

We must realize that the selling of generators, motors and electrical equipment to central stations and large industrial establishments, where the demand generally speaking does not have to be created, and where we are dealing with men who know what they want, is quite different than that of selling appliances and supplies where the demand must be created and where we are dealing with people who are not familiar either with the mechanical or electrical features of the appliances we are endeavoring to sell. We must, therefore, recognize these two different phases of sales conditions and adapt ourselves in either case to the selling methods necessary to bring in results through which all the industry will benefit.

Reduced to Figures

Just let us think of the tremendous possibilities in figures, and we will have more conception of what they mean.

Our Province has a population of approximately 2,800,000. Using a figure of five as being the average number of persons per family, gives us an approximate total of 560,000 homes, of which 200,000 are now users of electric service. This leaves 360,000 houses still unwired. Taking an average cost of wiring each house as $60.00, and $40.00, for fixtures, we have a total of $36,000,000. of business. As the central station must spend approximately $40.00 for each new customer taken on, to cover material right back to the generating station, if these 360,000 prospects could be supplied with central station service, it would mean an additional amount of business of $14,400,000. Where the central station might not be able to supply some of the 360,000 prospects, they would then be prospects for isolated lighting plants, representing where there were any great number of them, a large amount of money.

Now let us consider the possibilities in appliances. We already have 200,000 users of electric service, of whom we are safe in saying only a few have appliances in their homes. These we may, therefore, consider as immediate prospects, and together with the 360,000 to be developed, gives us a total of 560,000, to whom we can endeavor to sell our appliances. Each of these should be a prospect for appliances to the value of, say, $500.00 made up as follows: electric range, $125.00; washing machine, 135.00; vacuum cleaner, $60.00; irons, toasters, $12.00; air heaters, $10.00; water heater, $30.00; electric sewing machine, $60.00; fan, $20.00 percolator & teapot, $35.00; heating pads, $15.00; etc. etc.

In the aggregate this amounts to $100,000,000 possible sales to present users of electric service; and to those to be developed $180,000,000, or a grand total, including wiring, central station equipment and appliances of $330,000,000; and this without taking into consideration the growth which is bound to take place in our Province.

Therefore, if we can get our message across in an intelligent and convincing manner, we can divert money into electrical channels, which is now being spent on automobiles, pianos, phonographs, etc

Selling Ourselves

Before, we can hope, however, to get our message across, we must be first of all 100% sold ourselves on what these labor saving appliances will do, and what they mean to the home. One way to accomplish this is to encourage the use of these in the homes of those employed in the industry. Special terms of payment could doubtless be extended to employees by manufacturers, central stations, jobbers and dealers. Anyone endeavoring to interest a prospect must expect to be questioned as to the use of appliances in his own home, and if he is able to tell the story from actual experience, a very much more convincing message can be given, and one which will carry more weight.

In conclusion, the electrical labor saving appliances we are trying to sell to all users of electricity will help to make duties easier, and more pleasant; the household tasks which are now irksome will be lightened, and the work done more easily, more quickly, more efficiently, more economically, and more pleasantly. Better and more healthful living conditions will result. The duties of the store, office and factory will be done easier and better with a pronouncer saving in both time and money.

When we ourselves are convinced that these wonderful benefits are actually secured through the use of our electrical labor saving appliances, we can be very sincere in our efforts to place them in every home and know they will give value in full measure for every dollar invested.

Mr. H. G. R. Williams has opened up a business at 12 South Main St., Welland, Ont., as an electrical contractor and merchant. These premises are temporary, however, on account of the difficulty of securing a more suitable location. M. Williams hopes, in the near future, to be moving into more suitable premises.

"It Shall be Done"

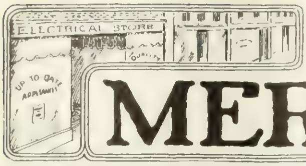
Do you remember "The Go-Getter", that inspirational short story by Peter B. Kyne, whose hero "Bill Peck" crippled in France but still carying on with his motto of "It Shall Be Done", secures, despite apparently unsurmountable difficulties, a certain blue vase which he had been commissioned to obtain? This tale of a true fighter has lifted many a salesman from the rut and set his feet on the road to success. It remained for The Hoover Suction Sweeper Company, however, to apply "Bill Peck's" principles to a large selling organization.

This company has set aside a certain quota of Hoover cleaners for each of its salesmen, and its district and divisional managers. Those whose sales equal or better their quota figures will qualify as "Go-Getters" and will receive a handsome blue vase, symbolic of "Bill Peck's" feat and their duplication of it, and in addition all "Go-Getters" will be taken to the annual Hoover convention this summer at North canton, Ohio, at the company's expense.

The entire Hoover organization is greatly enthused over the contest and every manager and salesman is putting forth every effort to beat his quota and win the blue vase. Under the co-operative plan which is in effect between the Hoover company and its dealers, whereby the company's salesmen sell directly for the dealer, it is expected also that many electrical stores handling the Hoover will benefit from the contest in the increased sales that the salesmen, working earnestly to win the title of "Go-Getter", will make.

Special Showcase Lighting

One of the problems of store lighting, which has vexed the electrician as well as the storekeeper, is that of satisfactory lighting for show cases. There is either too little light or else the glare of a sufficiently strong lamp dazzles the customer without properly illuminating the display in the show case. A recent installation in the stores of David Spencer Limited, Vancouver, is giving excellent service with a maximum of luminosity in all parts of the showcases. There were fifty in all of these showcases in which the reflectors were installed. The cases are wired with the lights and reflectors at the top in front. The effect is to direct the lights to the side walls as well as downward, diffusing the illumination evenly and lighting the entire display of goods in the case. The reflectors illustrated are the National X-Ray type and were supplied by the Northern Electric Company.



BETTER MERCHANDISING

A "One Man" Electric Home

Sometimes a man gets an idea that looks good, but lacks the punch to put it over. And other times, we find men with lots of punch and few ideas. The happy combination puts over stunts that look mighty difficult to the pessimists—so we've got to call Mr. R. Simpkin, of Weston, Ont., a happy combination. He has accomplished the task of putting on an Electric Home all by his lonesome.

Quite some time ago Mr. Simpkin came to the conclusion that though the people of Weston were ahead of the times in many other ways, their ideas of the value of electrical appliances might be changed to his advantage. So he began to cast around, and as a result:—

1. He secured, gratis, from a builder, a house for his purposes.
2. He persuaded a local firm to furnish the said house.
3. He filled the house with electrical appliances, including a radio set.
4. He put on an Electrical Home Exhibit.

As the house had already been wired for the builder, by himself, there was no outlay for that item. Newspaper advertising, demonstrating staff salaries and his own time were the only expenses, current being supplied free by the local Hydro Commission. Mr. Simpkin figures the whole cost of the exhibit at about $150.

The display included the usual appliances, wired furniture and electric kitchen. As there is no gas supply in Weston, the range and water heater attracted more than usual attention.

Before and during the exhibit invitations were sent out by mail; newspaper space was used and this publicity was supplmented by cards tacked up in conspicuous positions.

Visitors came in a steady stream. The bungalow was open for 10 days, and the demonstrators were kept busy from 10 a.m. to 10 p.m. A happy circumstance was that at the time newspaper radio concerts were available.

Results in the concrete form of orders for wiring, appliances and radio sets, are coming in fast. Mr. Simpkin is more than pleased with his effort.

What Seven Contractor-Dealers —Working together—can accomplish

The Electric Show in Kitchener, Ontario

The biggest Thing of its Kind in recent years—Stimulated Public interest and demand for Electrical Appliances

Was the Kitchener Show a success?

Ask the electrical Contractor-Dealers.

Kitchener is a city of about 20,000 inhabitants. There are seven electrical dealers and, "Hydro" supplies the juice.

Nothing unusual about that?

Why, no, not exactly, but when you come to look below the surface there **is** something unusual about Kitchener.

How does the following line-up appeal to you?

1. Every one of the seven contractor-dealers is a member of the local Contractor-Dealers' Association and of the Ontario Contractor-Dealers' Association.
2. Every one of them is on speaking terms—friendly, in fact—with every other.
3. Every one of them is a **Co-operator.**
4. V. S. McIntyre, the Hydro manager, gave substantial backing.
5. "Pop" Phillip, who put the show on, worked about 24 hours a day for the last two months, co-operating with everybody and—it's his own secret how he manages it—getting everyone to co-operate with him.
6. Kitchener is a real wide-awake little city whenever there's business going.
7. The manufacturers and the Ontario Hydro co-operated, too.

Briefly, those are the reasons why the Show was such a huge success.

We said Kitchener had a population of about 20,000. Well, during the week of May 1-6 fifteen thousand of them visited the Show, inspected the electrical goods, asked questions and (a goodly number of them) carried home appliances. A lot more gave their names to the contractor-dealers, who will keep in touch with them till their wants are supplied. The dealers are all enthusiastic about the amount of business that has been stirred up.

We also said the contractor-dealers co-operated. There was never anything like it before in the industry. The seven different contractor-dealer firms occupied one large booth in the centre of the hall—the same booth—pooled their interests—sold their various merchandise over the counter—sold one another's merchandise—and apportioned the profits. Just think of it!

How could it fail to be a success?

The pictures on the following pages tell the rest of the story. There were 60 exhibitors in all, representing equipment on display to the value of perhaps $200,000. The attendance was highly satisfactory. Not only has it been estimated that three out of every four people in Kitchener visited the Show, but there were visitors from outside points all over Ontario. Mr. Philip, with whom the idea of the Show originated, understands the psychology of the show business. He doesn't believe in giving anything away for nothing. His idea, rather, is to sell something for a price and give value. The booths for the week cost $65. each. The entrance fee was twenty-five cents. Did this keep anybody away? Mr. Philip thinks not. On the contrary, he believes that it was the means of bringing in a number of substantial people who would not have come otherwise, and it kept the disinterested class away—the people who were merely looking for entertainment. Mr. Philip estimated that at least 90 per cent of those who visited the Show were interested in finding out something more about electrical appliances and what they will do.

The contractor-dealers of Kitchener have still another laudable characteristic. They believe in themselves. They believe that electric stores are the proper places to purchase electrical goods and they believe in telling the people about it in plain courteous English. One of the best pieces of propaganda work at the Show was a little booklet gotten out by these seven dealers, which reads as follows:

Do It Electrically

Through the combined efforts of these Kitchener and Waterloo Electrical Contractor-Dealers supporting the plan of an electric show, has been made possible the presentation of this beautiful electric exhibition to you, and at a considerable expense.

The prime object is promotion of the electric idea, exhibiting and demonstrating all the newest, latest, and most dependable electrical appliances on the market.

These Electrical dealers are men of experience and you can rely on their advice, as being dependable.

Buy Your Electric Wants From an Electric Store

You then deal with the electric trade direct and if you require any repairs or service, they are in a position to intelligently serve you and give you satisfaction.

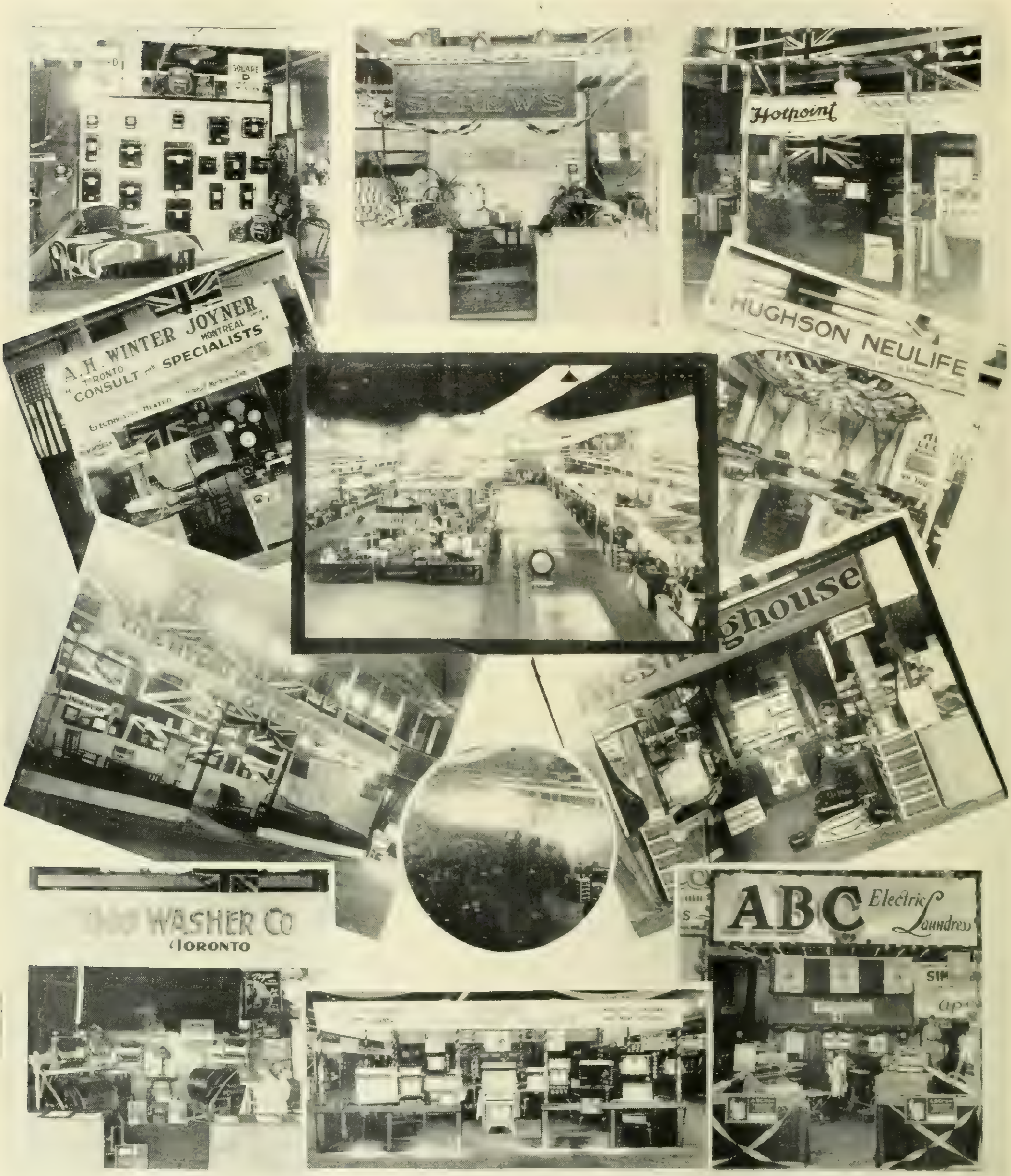
The natural outlet for electric merchandise is through an electric store and not through merchants who merely handle electric goods as a side-line, for the exploitation of temporary profit. When you need service they are not in a position to intelligently adjust your troubles, and then you have to call in your electric dealer. For that reason he is fairly entitled to the business in the first place.

The dependable electric dealer does not select goods for mere profit and sale, but his long experience enables him to select the best electric merchandise, backed up by manufacturers of unquestionable standing and you are assured of getting the best, and that is really what you want.

Let us serve you and you will be pleased with the results.

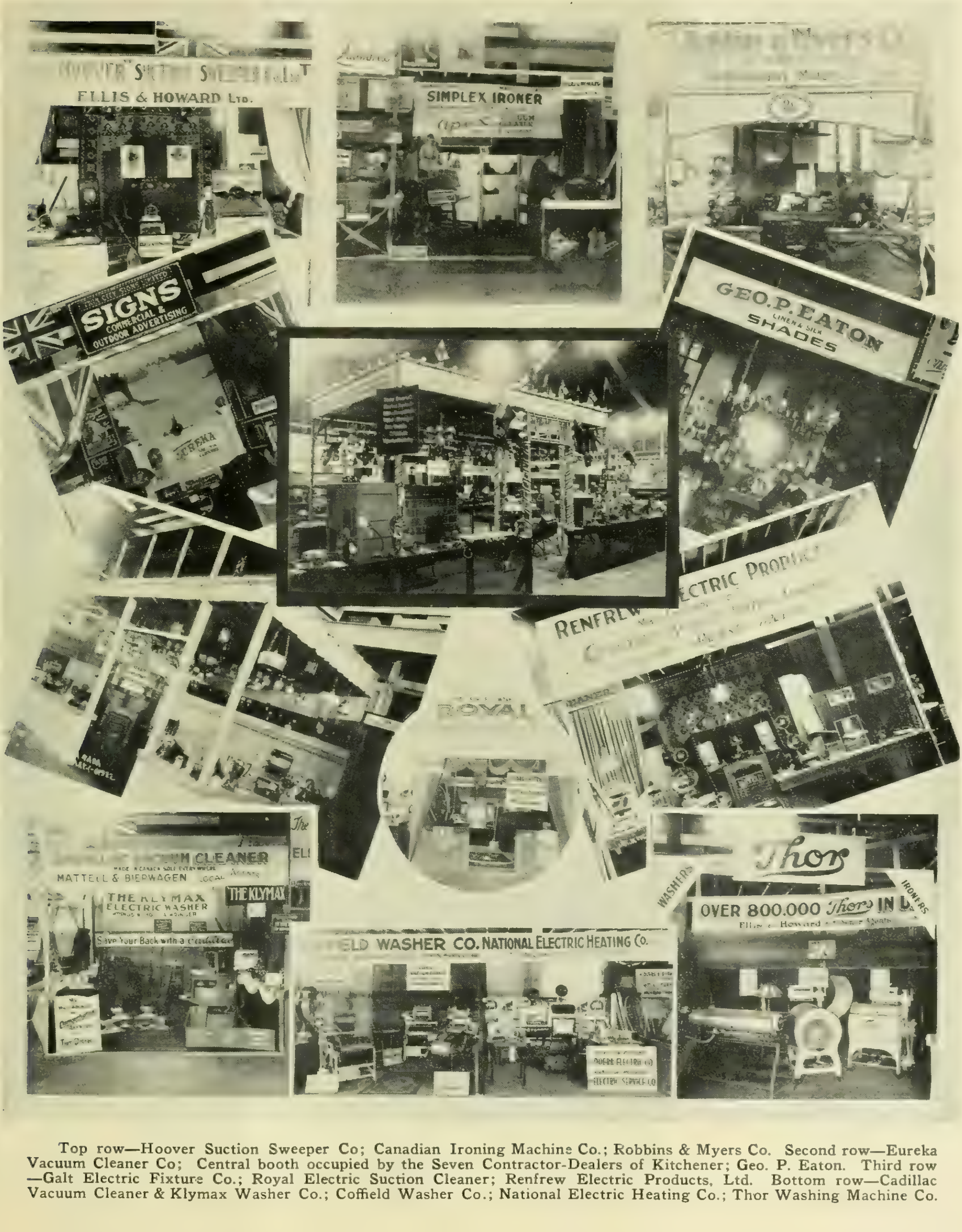
Yours for better service.
Kitchener and Waterloo Electrical
Contractor-Dealers
Signed:
Doerr Electric Co.
Electric Service Co.
Mattell & Bierwagen
Ellis & Howard, Limited
C. F. Schmidt
Star Electric Co.
Waterloo Electric Shop

Contractor-Dealers of Kitchener Practice Gospel of Co-operation



Upper row—Square D Company; P. L. Robertson Mfg., Co.; Canadian Edison Appliance Co. Second row—A. H. Winter Joyner, Ltd., & Ingersoll Machine & Tool Co.; a General View of the Show; Hughson Neulife. Third row—Ontario Hydro Commission; the Building was Crowded at Nights; Canadian Westinghouse Co. Bottom row—1900 Washer Co.; Moffat Electric Co.; Altorfer Bros. Co. (C. D. Henderson) and Henderson's Business Service, Ltd.

Some Attractive Corners in the Recent Kitchener Electric Show



Top row—Hoover Suction Sweeper Co; Canadian Ironing Machine Co.; Robbins & Myers Co. Second row—Eureka Vacuum Cleaner Co; Central booth occupied by the Seven Contractor-Dealers of Kitchener; Geo. P. Eaton. Third row—Galt Electric Fixture Co.; Royal Electric Suction Cleaner; Renfrew Electric Products, Ltd. Bottom row—Cadillac Vacuum Cleaner & Klymax Washer Co.; Coffield Washer Co.; National Electric Heating Co.; Thor Washing Machine Co.

Everything on exhibit was for sale and it would appear that a considerable amount of business was done right on the spot. As already noted, seven local dealers pooled their interests in a large central booth and made a vigorous bid for business. They seemed thoroughly well satisfied with results.

"Pop" Philip

Of course Sir Adam Beck was on hand to open the Show. It must have been a matter of keen satisfaction to Sir Adam, to recall that almost exactly twenty years ago the first meeting to consider and discuss the terms of a union of hydro municipalities had been held in the same city and in the same hall. Never has the short period of twenty years witnessed so great a development as that shown by the electrical industry during the last two decades. Sir Adam considered this the greatest electrical exhibition of its kind ever held in the province.

Not only were the contractor-dealers well satisfied with results but so were the manufacturers. The Show brought in contractor-dealers from all over Ontario, and a number of manufacturers' representatives, in conversation with the Electrical News expressed their entire satisfaction with the number of sales they had made to visiting contractor-dealers. Such expressions as "Well satisfied"; "Very good results"; "Well satisfied with results"; "Made several sales each day", etc., were heard in practically every booth.

The Baseball Match

There was a baseball match, too, on Friday afternoon. Business was a little slack immediately after luncheon, so a picked team of visiting exhibitors challenged the local electrical baseball team. The game was fast and very furious and the scorer soon lost count. The question of who won the match has not yet been raised, but it was a delightful afternoon and everybody who was there was glad of it.

The Exhibitors

The following is a list of the exhibitors:

Ingersoll Machine & Tool Company; A. H. Winter-Joyner Company; Canadian Shade Company (two booths); Robertson Manufacturing Company; Square D Company; George P. Eaton; Robbins and Myers; A B C washer Company; (C. D. Henderson) Masco Company; Canadian Ironing Machine Company; Apex Sweeper; Elliot Machine Company; Marconi Company; Baetz Bros. Specialty Company (two booths); Onward Manufacturing Company; Renfrew Electric Products, Ltd.; Easy Washer Company; Canadian Edison Appliance Company; Hydro Electric Power Commission of Ontario; (four booths); Bluebird Corporation, Ltd.; Charles Branston, Hoover Suction Sweeper Co.; Beatty Bros.; Hughson Neulife Company; Cadillac Vacuum Cleaner Company, Empire Brass Company, Coffield Washer Company, National Electric Heating Company; Continental Electrical Company; Canadian Westinghouse Company, 1900 Washer Company; Twin City Signs; Thor Washer Company; Galt Electric Company (two booths); Moffat Stoves (six booths); and the Twin City electrical dealers: Waterloo Electric Shop, C. F. Schmidt, Star Electric Company, Mattell and Bierwagen, Ellis and Howard, Electric Service Company and Doerr Electrical Company.

The Sun Electric Company, Yates St., Victoria, B. C., has been awarded the electrical contract on a Club House being erected at Colwood, B. C., by the Colwood Golf & Country Club.

Some of the latest developments in Electric Fans

The Architect and the Contractor

The Architect is a Vital Sales factor from Start to Finish of the job —An indispensable link between Manufacturer, Contractor and Owner

By our Montreal Correspondent

"It is just a waste of time to try to do anything with the architects" is the almost universal verdict of the electrical contractor-dealers, whenever business conversation happens to drift on closer co-operation between the electrical contractor-dealers and the architects. The architects, perhaps, are the most difficult professional element in the construction industry to be drawn into intimate relations with the electrical interests, but there are other causes of the difficulty than those ordinarily attributed by the average electrical contractor-dealer—the snobbishness, because of his university education and the A.R.I.B.A., or a few other capital letters appended to his name.

There is no doubt that some of them can be accused of overestimating their own importance due to the reasons mentioned above, but, it is just as true of some men in other professions and occupations. A friend of mine, an honest, hard working chap, was recently introduced to a prominent business-man by one of their mutual acquaintances as Mr. So and So, K. C. Mr. Prominent Business-man was most courteous and hospitable towards my friend, but when asked how long he had been a King's Counsel and my friend informed him that he is just an electrical contractor and not a lawyer, and that his K.C. means a membership in the Knights of Columbus, the hospitality and most of the courtesy vanished. Mr. Prominent Business-man discovered that he had very urgent business to attend to and parted company with the electrical contractor So and So, K. C.

The Situation As it Exists

Let us analyze the situation as it actually exists, and discuss how we can improve the situation to bring about closer relations between the architects and contractor-dealers. The architect is the most important sales factor in the field, for in all matters he advises, and in matters outside the ken of the client, he decides.

In matters where the client has preconceived ideas about material and equipment—though these cases are not very numerous as yet in matters of electrical installations—the architect becomes the salesman either for or against these ideas. At all events, nothing of material importance can go into a job unless the architect considers that it is the best and most suitable that can be obtained for the money his client places at his disposal.

Any attempt to confine the effort of selling to the owner directly, to the exclusion of the architect is going to fall down. The architect's procedure is to take the more or less vague idea of the client, plus a more or less fixed sum of money, and evolve a tentative proposition visualized by sketch drawings showing the proposed arrangement and design. This is followed by the preparation of scale working drawings, specification, etc., leading up to the letting of the general contract. Up to this point both the architect and the owner have been planning for the things most desirable, but now they must fit these to the budget, which for many products and materials means elimination as well as substitution.

Those that remain are the ones on which the architect has been thoroughly sold.

Finally comes the supervisory stage, when the architect follows through the job, to satisfy himself that his specifications are lived up to and to solve the various unforeseen problems apt to arise during the process of actual construction.

Have We Done Our Part?

At each of these stages the work, material and effect are discussed by the architect and the client, but have the electrical manufacturers and contractor-dealers done their part towards familiarizing either of them with what they have to offer?

The thoroughness with which the architect has been sold is often reflected during the supervisory stage of the work, and if inferior products are being used as substitutes instead of those specified, it is because the architect has not been thoroughly sold and has not been given the opportunity to acquire the knowledge of the thing that he has specified.

The architect is a vital sales factor from start to finish of the job, an indispensable link between the manufacturer, the contractor and the owner. The architect is perpetually selling this product or that, in proportion as he has previously been sold on the merits of the product plus his own past experience or that of other architects whose names carry weight. He is singularly like other men, his own business being essentially a selling proposition, supported by the knowledge of ideals, economics and mechanics of construction products together with ability to analyze, judge, apportion, combine and correlate them. It must be remembered also that he is surrounded by a multiplicity of detail, much of which is altogether foreign to his artistic inclinations; therefore he must be given facilities for getting detailed information pertaining to such requirements when he needs it.

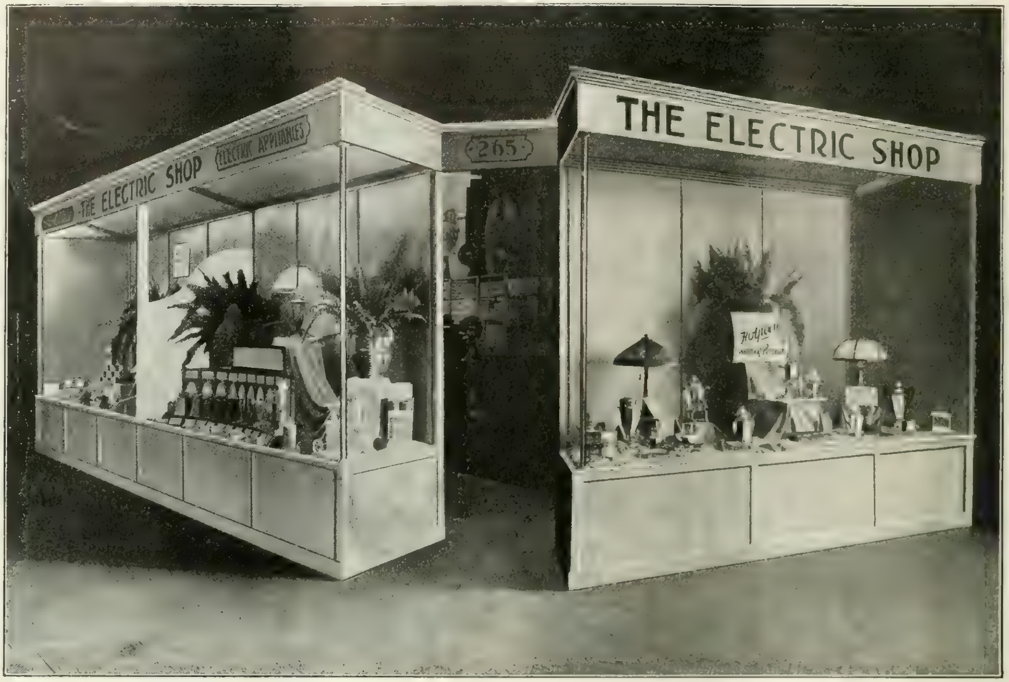
During the recent "Modern Electrical Home" exhibition in Montreal, several architects, visitors to the Home, admitted that such an educational campaign is one of the best means of establishing electrical installations and equipment, in the public mind, among the primary essentials of modern structures. The architects nevertheless have to be brought to the point of co-operating with the electrical industry in achieving the sought-for results, despite the opinion of most of them that as soon as the public are sufficiently educated to demand proper electrical installations and equipment they, the architects, will meet their clients' demands.

The Immediate Duty

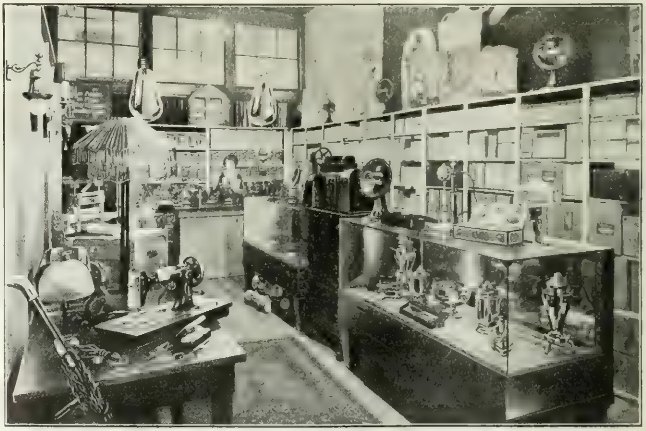
The immediate work of the electrical industry, in which all the branches are vitally interested, is to simultaneously educate the public to the wider use of electricity and to offer facilities to the architects to familiarize themselves and to keep posted with the ever increasing advantages and progress in electrical illumination, heating and labor saving devices.

The Electrical Co-operative Association, Province of Quebec, has recently sent a letter to some two hundred architects in the province soliciting their suggestions how to best bring them and the electrical industry into closer contact, and it is planned to have later in the fall joint luncheon meetings between their representatives and those of the association to develop closer co-operation. Arrangements are also being made to maintain, in a convenient and suitable uptown place, an exhibit of electrical supplies, which would be accessible to the architects for inspection.

The Manufacturer Can Often Assist the Dealer With New Sales Ideas



At a recent meeting of Electrical Contractors and Dealers at the Wallace Ave. Plant of the Canadian General Electric Co., the Company displayed a model store, both interior and exterior, as a help to the members. Some very excellent ideas were demonstrated.



Licensing and Inspection Law to be Enforced in Quebec Province

Enacted a Year Ago, the Act Has Remained a Dead Letter. Representation by Electrical Organizations Have Won Over the Government to Action

Electrical Contractor-Dealers in the Province of Quebec are rehearsing the ever popular song "There are Smiles that make us Happy, there are Smiles that make us Blue." Undoubtedly some feel happy and some very, very blue.

The provincial Government of Quebec published in the official Gazette on the 21st of May that on March 19th there was assented to and, by proclamation of the Lieutenant Governor in Council put into force, on May 23rd, an act amending the Revised Statutes, 1909, respecting the protection of public buildings against fire, II George V, chapter 75, popularly known as the "Electrical Licensing and Inspection Act." All this happened and was dated A. D. 1921.

Persistent rumors state that the system of selling electrical appliances was decided upon by the Government as the model for putting that law into operation. It was truly enforced on the installment plan. For over a year following the proclamation of that act, nothing was done by the Government whatever to protect the loss of property and lives from improper electrical installations and to prohibit incompetent men doing electrical wiring work.

The Electrical Co-operative Association, Province of Quebec and the lately reorganized Montreal Contractor-Dealers Association, both French and English, during the past few months made very strong representations to the Government officials directly connected with application of that act, regarding the urgent necessity of putting it into practice. This coupled with the recent disastrous fires in the Province which were attributed, and in some instances proven to be caused by, defective electrical wiring, had the desired effect.

Being Put Into Force

The Electrical Licensing and Inspection laws are at last being put into force. The preliminary work in connection therewith is already attended to, and it is hoped that within the next few months there will be no electrical contractor or journeyman without a license and a certificate of competency wiring as much even as a hen-coop.

To begin with, the new law will be put into practice in Montreal and the adjoining municipalities and in the city of Quebec; the rest of the Province will be taken care of at a little later time.

The near-beer, so common in other parts of the Dominion, is an absolute stranger to the citizens of the Province of Quebec, but the near-electrician can be found everywhere. He has, of course, a most detrimental and discouraging effect on the legitimate contracting business from every point of view, at the same time lowering among the public the idea of value and quality in electrical work.

Near-Beer Electricians

Those who have the qualifications to be electrical contractors or journeymen wear the smiles that make them happy; the near-bear variety electricians wear the "blue" kind of smiles. The latter will have to reconcile themselves with the fact that the electrical contractor-dealer and journeyman field is not a dumping ground for everybody and nobody, and that one must be skilled in this important trade and responsible in business to remain in it.

There is no doubt that by the time the next Legislature meets many improvements in the act will be sought; one of them will be the widening of its scope to include private dwellings as well. At last however a beginning is being made, which with a wide awake and efficient chartered Contractor-Dealers Association, with branches all over the Province, may serve to considerably improve the electrical contracting business and to assure safe electrical wiring to the public.

"§ 2.—Installation of Electrical and Heating Systems

"3789b. Every new installation, either for light, heat or motive power, as well as every heating system, in public buildings, must be submitted for the approval of the chief inspector of industrial establishments and public buildings, and to the examiners appointed for that purpose.

"3789c. Except in the cases hereinafter provided for, no person or company shall, carry on any business, undertake or work at the installation of wires, conduits or apparatus for the transmission of electricity, for producing light, heat or motive power, in this Province, as a contractor or as a journeyman electrician, unless such person or company has obtained a license from the examiners appointed for that purpose.

"3789d. Every installation of any kind of heating system in a public building already installed or which may hereafter be installed, must be approved by one of the inspectors of public buildings, who shall give a certificate to that effect to the owner of the building. Such certificate must be constantly kept posted up in a place indicated by the inspector.

"3789e. No electrical installation in a public building in the Province, for the transmission of light, motive power or heat, can be made or altered otherwise than by a person or under the supervision of a person duly authorized and having a license to that effect.

"3789g. The chief-inspector of public buildings may, with the approval of the Minister of Public Works and Labor, declare any electric installation or any heating system already in a public building, to be defective, and order the necessary alterations to be made, and, in default of compliance with the said inspector's orders to that effect, the owner shall be liable to the penalties provided by article 3782 and 3783.

"§ 3.—Examiners

"3789h. 1. The Minister of Public Works and Labor may appoint a board of examiners consisting of three members, who must be competent electricians, not under twenty-five years of age, and having at least five years experience as journeymen electricians. The persons so appointed must be able to speak and write French and English correctly.

2. The duties of such officers shall be as follows:

a. to examine all electric and heating installations submitted to them;

b. to examine all those desiring to become electricians, to issue certificates of competency and grant licenses;

c. to hold examinations in such places as the Minister of Public Works and Labor may be pleased to select;

d. to draw up a programme for the examinations, prepare forms and other documents for the same, collect fees, keep registers and facilitate the inspectors' work as much as possible.

"3789i. No apprentice, laborer or person not provided with a certificate of competency, shall have the right to put in electric installations, except as assistant under the immediate direction of a journeyman electrician with a license.

"3789j. Every company, association or person whose place of business is outside the Province of Quebec, and who wishes to undertake or furnish electric installations, under the provisions of this section, must appear before the board of examiners and obtain a temporary license allowing him to continue his operations during the time required for completing his contract. Such license shall expire as soon as the work is finished.

"3789k. No certificate or license issued under this act or the regulations may be transferred or conveyed; and every such license and certificate may be suspended or cancelled by the board of examiners for sufficient reasons. Such suspension or cancellation shall, however, be subject to appeal to the Minister of Public Works and Labor, and his decision shall be final.

"3789l. Every license issued to electrical installation companies or contractors, must be posted up in the offices of such contractors or companies, and every journeyman electrician, moving-picture operator or holder of a special license, must always carry a copy of his certificate on his person. Any omission to post up the license or neglect to carry the certificate required by the regulations, shall be prima facie proof of lack of qualification.

"3789m. Proof of the fact that a contractor, company, or association employs an unlicensed person for an electrical installation, or that such installation is done contrary to the regulations adopted to that end, or that the license was obtained under false representations, shall be considered sufficient cause, under the provisions of article 3789k, for cancelling the license of such contractor, company, corporation or association.

"3789n. Certificate shall be issued for the year, and must be renewed yearly between the first and fifteenth of May of each year.

Licenses of contractors, companies, corporations or associations may be issued at any time, but ten days notice must be given to the examiners.

"3789o. Certificates shall be given for the year and be renewed annually between the 1st of May and the 1st of October of each year. The rates for fees, as regards the examination of the installations mentioned in article 3789b, shall be based on the percentage of the value of the installation, to wit: one-half of one per cent, with a minimum of ten dollars. The rate for special licenses issued to non-resident contractors doing business within this Province shall be one per cent on the value of the contract with a minimum of fifty dollars.

"§ 4.—Certificates and Licenses

"3789p. 1. Five license forms shall be issued, designated as follows:

License A, which may be issued to any person who has satisfactorily passed the examination prescribed for journeymen electricians, and has filed an application to be registered as a contractor or master electrician in the examiners' office and paid the fee prescribed by this section;

License B, which may be granted to any company, association, corporation or firm doing or wishing to do business as contractor for electrical installation, provided one of the members of the said association, company, corporation or firm, or at least one person in its employ, holds a certificate of journeyman electrician given by the examiners, and that the fee for the license has been paid;

License C, which may be given to a journeyman electrician, having at least five years experience, and who, after passing his examination successfully and complying in every respect with the prescriptions contained in the forms prepared by the examiners, has paid the fee prescribed by this section;

License D, which is that authorizing a person to take charge of a moving-picture machine. Every person applying for this license must be not less than eighteen years old, pass an examination before the examiners, obtain a certificate of competency and pay the fee hereinafter prescribed.

The operator is especially required to keep a copy of the license granted him posted up in a conspicuous place;

License E, which is the special license authorizing a person with a knowledge of electricity and employed in a public building, to do work in connection with the repair and maintenance of electrical installations in the said public building.

The person applying for such special license must pass an examination before the board of examiners.

2. Every person operating a machine driven by electricity, such as winches, derricks, travelling cranes, or any other machines more or less dangerous to the operators, workmen or the public, must obtain a license.

"3789t. 1. This section and the regulations enacted thereunder shall not affect the work in electrical stations or their branches where electric power is generated, either by a public service corporation or a municipal service, where the work is done by the employees under the control and direction of the officers of the said corporation or municipal service;

2. The following are excluded from the effects of this section and of the regulations:

a. telephone and telegraph installations where power is supplied by primary galvanic wires;

b. locomotives, cars and tramway systems operated by a public service;

c. the installations of arc lamps, used for lighting streets and public roads and operated by a public service;

d. the lights and glass bulbs, used in private houses, and the installation or preparation of carbons in arc lights in public streets.

‘§ 6.—Examinations

"3789u. Every person wishing to obtain a certificate either as a journeyman electrician, an operator of a moving-picture machine, special operator or as being in charge of hoisting apparatus as electrician, must send an application to the board of examiners on a form supplied to him for the purpose. He must give information regarding the duration of his service in his present employ and also give the board of examiners satisfactory information regarding his conduct and sobriety.

"3789v. The code known as the "National Electric Code" shall serve as a basis in drafting the examination programmes, as well as the forms and questionnaires to be used by the examiners upon the examination of candidates for certificates as electricians;

The examiners may also require from the candidates a practical as well as a theoretical demonstration in the installation of electric power in the buildings mentioned in this section.

"3789w. Every stationary engineer holding a first or second class diploma has the right to do improvement and repair work on electrical apparatus, but only in the workshops or factory where he is regularly employed.

"§ 7.—Penalties

"3789x. The following are liable to the penalties provided by article 3782, namely: every firm, company, corporation or person contracting for electrical installation work for the production of light, heat or motive power, without a license or without being under the supervision of an electrician holding a diploma under this section or the regulations.

"3789y. The following shall be liable to the penalty provided by article 3782, namely: every journeyman electrician, operator of a moving picture machine, as well as every person in charge of repair or maintenance work in the buildings mentioned in this section comprised under the name of "Special License E," as well as every person in charge of the operating of electric machinery mentioned in the regulations, who neglects or refuses to pass his examinations before the examiners, or who, without holding the certificate required by law and by the regulations, contracts for electrical work either in connection with the installation of wires or other electrical apparatus, or for the operation of the said electrical machines.

Inspection of the electrical installations and work as yet is confined to public buildings, which according to the act mean and include: churches and chapels, or buildings used as such, seminaries, colleges, convents, monasteries, school-houses, public or private hospitals, orphan asylums, infant asylums, charity workrooms, hotels, boarding houses, capable of receiving at least fifteen boarders, theatres, halls for public meetings, lectures or amusements, buildings for the holding of exhibitions, stands on race courses or other sporting grounds, buildings in parks, skating rinks, rooms for showing moving pictures, buildings of three stories or more over the ground floor occupied as offices, stores employing at least ten clerks and court houses.

This act should prove of interest not only to the contractors in the Province of Quebec, but to contractors of Ontario as well, as occasionally large jobs in this Province are being successfully tendered for by outside concerns.

The Development of Wireless-V

A Series of Short, Interesting Articles Covering Wireless Progress to Date

By F. K. D'ALTON

From the time that wireless communication was first applied it has been the aim of scientists, who worked with these waves, to bring to perfection the radio telephone. Most of the improvements made in wireless telegraph systems have brought the telephone closer and it might be well to list again the steps which we have already described.

The earliest detecting devices indicated the presence of the waves but did not give their characteristics. Then came the magnetic, crystal and electrolytic detectors giving the necessary quantitative response, and being self-adjusting. These were followed by the valves giving clearer and louder signals which by amplification through valves were increased to any desired intensity as sound.

The spark transmitter gives the damped wave which has in it a definite note determined at the sending end and therefore could not be modulated by the voice to such an extent that the inherent note would be overcome. The continuous wave alternator or arc transmitter overcame this difficulty but there was not a suitable telephone transmitter available which could carry the large currents necessary for giving good radiation and working several miles and there were no further developments toward the wireless telephone until it was found that the oscillating three-element valve was capable of generating high frequency currents and of radiating waves of radio frequency at the same time being conveniently controlled by an ordinary telephone transmitter working through a small "modulation" transformer on the grid of this same valve.

The telephone transmitter carrying a small direct current is capable of varying this current in accordance with sound waves from the voice or a musical instrument. This varying current is carried through the primary winding of the modulation transformer and in consequence the voltage induced in the secondary winding has variations corresponding exactly with the changes in primary current. Now, a three electrode valve is connected as follows:—

Between filament and grid are connected the secondary winding of the modulation transformer in series with a coil of wire known as the "grid coil".

Between the filament and plate are connected a source of voltage (d.c.) and another coil known as the plate coil. Variations in plate current, through the magnetic coupling of coils cause changes in grid voltage and the reverse is true through the action of the valve.

The oscillating current resulting from this combination is made to build up a current in a third circuit consisting of another coil placed near to the plate coil, and the aerial as capacity. The consequence is that a high frequency current flows into and out of the aerial. The grid voltage is varied by the

STATIONS WITHIN REACH OF TORONTO'S RADIO FANS

Time signals:—	Wave length (meters)	Hour received	Type of Emission	Distance in miles
Arlington, Va.	2500	12 a.m., 10 p.m.	Spark	340
Annapolis. Md.	17000	12 a.m., 10 p.m.	c.w.	430
San Diego, Cal.	10000	3 p.m.	c.w.	2200
San Francisco, Cal.	5000	3 p.m.	c.w.	2200
Balboa, Panama.	6800	3 p.m.	c.w.	3100
Weather:—				
Toronto	600	10.05 p.m.	spark	10
Midland	600	10.05 p.m.	spark	110
Market reports, sport results, world news:				
Pittsburg, Pa.	330	6, 7, 8.00 p.m.	radiophone	235
Music:—				
Marconi. Tor.	1200	8-10 p.m. Tues.	radiophone	10
Can. Ind. Tel., Tor.	450	8-9 Mon. Thurs.	radiophone	7
Pittsburg, Pa.	330	8.30-9.30 p.m.	radiophone	235
Newark, N. J.	360	8.15-9.20 p.m.	radiophone	345
Springfield, Mass.	360	8.15-9.20 p.m.	radiophone	340
Chicago, Ill.	350	8.00-11.00 p.m.	radiophone	450
Church Services on Sundays:—				
Pittsburg, Pa.	330	10.45-12 a.m.	radiophone	330
		7.45-9.00 p.m.	radiophone	330

The relative signal strength obtained by various transmitters and receivers, without amplifiers is shown in the following table:—

Transmitter	Receiver	Signal strength
Spark	Crystal	1
Spark	3 electrode valve (not oscillating or regenerating)	3
Spark	Valve (regenerating)	10
Spark	Valve (oscillating & regenerating)	75
Buzzer modulated C.W.	Valve, not oscillating or regenerating	36
Arc—C.W.	Valve (oscillating)	300
Oscillating Valve—C.W.	Valve (oscillating)	600
Radiophone	Valve (regenerating)	125

voice through the agency of the telephone transmitter and modulation transformer and the energy in the radiated wave varies accordingly. The amplitude of the wave follows another wave which is a duplicate of the voice wave.

A wireless telephone could be detected on any receiver giving quantitative response—several of which have already been described.

The radio telephone then became a reality.

Its popularity is rapidly increasing as it does not require that the operator at the receiving end know anything of the conventional codes used in telegraphy, he only needs to have a fair knowledge of how to tune his receiving devices.

There are many methods of connecting the wireless telephone transmitter, only one of which is described here and it is usual to find a much more elaborate scheme in use, especially in the higher powered stations.

The scheme we have outlined is one in which the radiated wave is modulated by the voice controlling the grid voltage. Another good arrangement causes the voice to control the power supply; in still another scheme the voice controls the plate voltage. These have their advantages each one being found best in its own field and between certain limits of wave length and power.

Manufacturers of radio apparatus find the wireless telephone most useful in advertising their goods and entertaining their customers. They reach directly the very people with whom they do business and the people who understand the usefulness and advantages of wireless apparatus.

Foremost in this, is the Westinghouse Company who operate four wireless telephone stations—namely at East Pittsburgh; Newark, N. J.; Chicago, Ill.; and Springfield, Mass. From these stations every evening there go out concerts lasting for one, two or three hours, and in addition announcements of baseball, football and tennis scores, world news of interest, stock market and live stock reports, police reports of cars stolen, children lost, etc., and on Sundays the services of various churches, complete, including the sermon.

President Harding's speech on Armistice Day was sent out from Pittsburg, Pa., and in the evening a special Armistice Day address by Mr. W. E. MacGregor at Pittsburg. This is but one instance of special radiations. Musical concerts are sent out regularly by two stations in Toronto, both companies being manufacturers and distributors of wireless apparatus, and these are received at distances of seventy-five to one hundred miles.

The radiations from all of the Westinghouse stations come in very nicely in Toronto and are heard by about fifty amateur receiving stations in the city. It is quite the custom now for an amateur to put a "loud speaker" horn, etc., onto his receiver and entertain his friends in the evenings by concerts from these wireless telephone transmitting stations in the United States.

In addition to the music, etc., there are a few other conveniences. Time signals are sent by many commercial and navy stations at various hours of the day thus providing an accurate means of regulating your time pieces.

Weather reports are sent out from local stations on the Great Lakes enabling the listener to know in the evening the probablities for the morrow.

The following telegraph and radio telephone stations are used regularly by the writer whose receiving station is located about ten miles northwest of the city of Toronto:

Certain types of aerial have directional effects in both transmitting and receiving. By making use of this fact, it becomes possible to give ships at sea their bearings, to direct them through fog while some distance out of port, and also to direct aeroplanes to their hangars or to particular stations which they are anxious to reach at night or while visibility is low during the day.

The chief remaining advantage in the spark stations rests in its ability to interfere over a great range of wave length thus making "S.O.S" calls at sea more certain of reception.

Gears of Woven Fibre

Gear cutting materials in the past have been more or less standardized, and the introduction of a new compound material has aroused interest among manufacturers and users. The base of this material consists of vulcanized woven fibre. This is combined with a condensation product made of phenol and formaldehyde. The combination is hardened and becomes inert, insoluble and infusible. It is sold under the trade name of Condensite Celoron, and the following summary of claims made in its behalf is of interest :—

(1) It is unaffected by ordinary solvents and by most acids and weak alkaline solutions.

(2) Possesses high dielectric strength.

(3) Is resilient and shock resisting.

(4) Is workable by any machining process.

Physical Properties

The material has been subjected to engineering tests with the results indicated below :—

Tests show that Condensite Celoron has a tensile strength of 8,000 to 10,000 pounds per square inch. Its compressive strength is approximately 40,000 pounds per square inch, laminae horizontal, and 2,500 pounds per square inch laminae vertical. The transverse strength is approximately 23,000 pounds per square inch, laminae horizontal; and 25,000 pounds per square inch, laminae vertical.

Modulus of elasticity (the load per square inch divided by the elongation per inch) is approximately 1,550,000 pounds on the average of 10 readings.

Specific gravity 1.3 to 1.4.

Brinnell hardness (by applying standard formula to the measurement of the impression made by a 10 mm. steel ball held under pressure of 500 kg. for 15 seconds) on natural face 45, on sawed face 36,40.

Coefficient of expansion .000017 in. per degree Fahr.

With absorption, test pieces 1 in. thick, .46 in 24 hours, 1.08 in one week. Absorption measured in percentage of original weight.

Little Alteration of Standard Practice

Gear cutting from Condensite Celoron involves no radical change in the practices usually followed. It should be mentioned that the maximum thickness of a single sheet is 3 inches, and that for gears over 3-inch face, two or more pieces fastened together must be used.

Under a steady load, one way rotation, the maximum fibre stress on the key way may be safely estimated at 3,000 pounds per square inch. In extreme cases the use of a larger key may help, or end plates may be necessary. On standard gears the use of shrouds is not recommended. Gears of larger diameter in proportion to their face may because of high pressure on the key, require end plates or metal hub to relieve the fibre stress. Gears of small diameter and larger bore may require end plates to prevent distortion when the key is driven.

There are two hard and fast rules in connection with the installation of gears of this type, which are that they must always mesh with cut metal gears—never with other non-metallic gears having uncut, cast or badly worn teeth and that in every case the face of the mating gear should be equal to or greater in width than the Condensite Celoron gear.

Province of Quebec Adopts Single Service Entrance in All New Buildings

Some time ago the Electrical Co-operative Association, Province of Quebec, on suggestion of its central station members, took steps towards the introduction of a single service entrance for any one class of service in new, remodelled and, where possible, to apply in existing buildings. The reasons for it were economy, safety and elimination of much too frequent disfiguring of buildings which instead of adding to the appearance of the community, were becoming eye-sores indeed

The Committee drafting these regulations consisted of L. A. Kenyon, engineer of electrical distribution, Montreal Light, Heat & Power Cons.; N. L. Engell, superintendent of distribution, Montreal Public Service Corporation; E. A. Stanger, distribution engineer, Southern Canada Power Co.; H. A. Elliot, representing the Shawinigan Water & Power Company; Geo. Templeman, engineer, City of Montreal. Electrical Commission; J. N. Mochon, electrical examiner, Provincial Government of Quebec; C. M. Tait, chief electrical inspector, Canadian Underwriters' Electrical Inspection and Louis Kon, secretary-manager Electrical Co-operative Association Province of Quebec.

The Architects Association and the Builders' Exchange had, on that Committee, their representatives in advisory capacity, the former being represented by Frank R. Foster, treasurer of the Architects Association and the latter by John Quinlan, building contractor and Harry Vincent, electrical contractor..

As a result, the following rules were adopted and are being printed for distribution by the Fire Underwriters' Association as a supplement to the Code, effective from 1st of June this year.

Wiring Rules

Overhead wires from poles to building are objectionable in many ways and their number should be kept at a minimum. As a general rule there should be only one set of lighting or power service wires running from the pole to the building. If a building is already wired and additional apparatus is installed arrangements should be made to connect the new work to the service already in, increasing the capacity of this service if necessary. If the service already in does not comply with the present specifications it is recommended that a new service of sufficient capacity for both the old and the new loads be installed.

The service wires attached to the building are without fuse protection up to the point where they reach the fuses on the service switch. An accidental ground or short circuit on this portion of the wiring generally results in the wires and the conduit burning out from the point where the trouble occurs to the end of the conduit where the wires from the pole are connected, and a fire may follow For this reason the amount of wires attached to the building and unprotected by the service switch fuse should be reduced to a minimum and the rules governing the installation of these wires should be strictly adhered to.

Service Switch

The service switch must, where practicable, be located in the basement. If there is no basement the service switch must be located in some other public part of the building if there is one, and must be so placed as to provide sufficient space for meter **installations.**

The service switch and fuses must be enclosed in a place where the wires enter the building. The service box must be of approved design, arranged to be operated from the outside of the enclosure, equipped with a locking or sealing device, and shall be so marked as to indicate without opening the enclosure whether the switch is in the "on" or "off" **position.**

The service switch must not be located in a coal bin, clothes closet, pantry, bath-room, or in any room that is liable to be locked, or in a location where the passage to same is liable to be locked.

The service switch cabinet must be fitted with a short conduit nipple to take the wires running to the meter. This nipple shall be set in either side or top of the cabinet, but not in the bottom, and must be fitted on outer end with lock nut and bushing with which to secure it in the meter trim.

Service Wires

The service wires whether from overhead or underground must be installed in conduit.

There must be no splices in the service wires between the service cutout and the point of connection with the wires from the pole or manhole.

Only one set of wires for each class of service may be run from the pole line to the building.

Service wires running across up or down building walls must be installed in conduit.

Conduit work on services must be waterproof. Junction boxes must not be used if they can be avoided. If they are necessary they must be of the waterproof type with the covers gasketed.

The service conduit must be placed on the outside of the building but may be embedded in concrete or other fire proof walls.

The conduit must be equipped with a service head. The wires must leave the fitting through separate insulated holes which are turned in a downward direction so that water cannot enter. The service entrance fittings must be of such design that water cannot enter.

Grounding

All service conduits must be grounded. The ground conductor must be at least equivalent to No. 8 B & S gage copper (where the largest wire contained is not greater than No. 0 B & S gage) and need not be greater than No. 4 B & S gage (where the largest wire contained is greater than No. 0 B & S gage).

Grounding A. C. Services

All alternating current services must be grounded on the line side of the main switch and fuses.

The ground conductor for a.c. services must not be smaller that No. 8 B & S gage copper wire, nor smaller than one-fifth the current capacity of the wire to which it is attached, except that it need not be larger than No. 0 B & S gage.

The ground conductor for the service must be used as the ground wire for the conduit, or for any other purpose.

D. C. Services

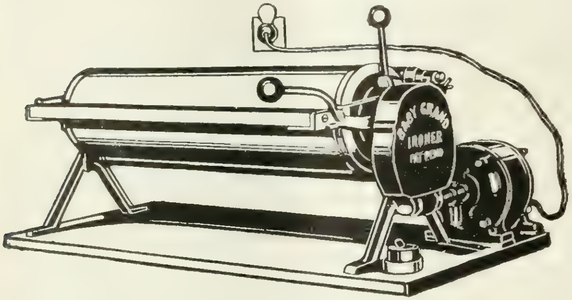
Direct current systems must not be grounded at the individual services or within the building served.

In every building whatsoever now existing where electricity is at present or may hereafter be used for lighting purposes, the wires transmitting such electricity shall be so put in said building that they can be connected inside of such building with the underground conduits.

C. C. Carter and E. Bretell, prominent in the electrical industry in Vancouver, have been elected members of Vancouver Rotary Club, as representatives of the industry.

The Latest Developments in Electrical Equipment

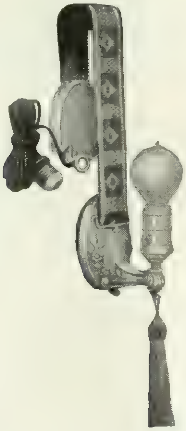
The Ingersoll Machine & Tool Company, of Ingersoll, Ont., have recently placed on the market the "Baby Grand" portable ironing machine. The manufacturers claim it is designed, both as to size and price, for the average household, its special features being light weight, simplicity of operation and small dimensions. This machine is 3 ft by 15 inches in size and weighs 75 lbs. It is gear driven by standard motor. Pressure upon the ironing shoe can be varied up to 500 lbs. The ironer is heated by either gas or electricity.



The "Baby Grand" portable ironing machine

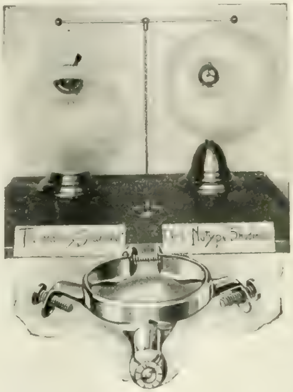
The "Lamp Ette" Hangs Anywhere

The "Lamp Ette" hanging lamp device here illustrated is now manufactured in Canada by the Crown Electrical Manufacturing Co., of Brantford, Ont. This is a portable electric bracket lamp attached to a silk brocade braid, on the other end of which is an ornamental plaque which acts as a counterweight. This lamp may be had in three colors of silk braid—gold, rose and blue— and may be used as a bed lamp, a piano lamp, a chair lamp—in fact, may be hung over any convenient object and used for any purpose.



The "Nutype" Shadeholder

The Canadian General Electric Co. Limited, is manufacturing a new one piece, brass, three arm shadeholder, Cat. CGE 2 "Nutype" for use with 2¼ standard shadeholders and patent has been applied for. The shadeholder is of sturdy design with three arms supporting the shade rigidly at three distinct points 120° apart. The arms are reinforced by lengthwise embossings which extend upwards well into the socket bead band and downwards over the lip of the shade into the cupped sections taking the shade holding screws. The clamping band encircling the socket bead is reinforced by turning in the edges giving the effect of a 1/16 in. flange all around and is so shaped that the shadeholder is universal and can be readily used with either the standard round bead or the threaded bead socket shell. The clamping screw on the bead band is of generous length to allow for any amount of variance in diameters of beads and its length does not allow it to fall out with the clamping band opened to the fullest extent necessary to slip on any socket. This easy and positive method of attaching shades to standard sockets has made this device very popular with the trade.



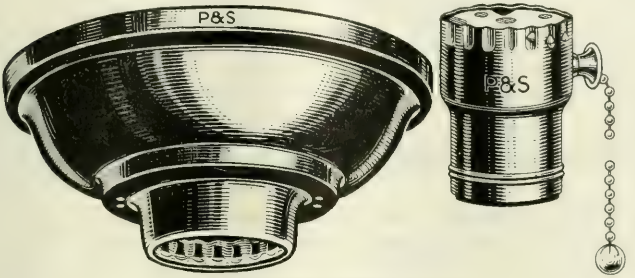
The illustration shows a test made with the "Nutype" shadeholder versus the ordinary shadeholder. The test was made for a period of twenty-four hours, and as will be seen, the ordinary shadeholder was not able to support the heavy glass shade, which sagged down considerably.

Fred E. Garrett, who for the past six years has been associated with the Great West Electric Co., Ltd., Winnipeg, has resigned. During the past three years Mr. Garrett has held the position of sales manager of this concern. Prior to joining the staff of the Great West Electric Co., he spent six years with the C. G. E., at Winnipeg, looking after the city sales. Mr. Garrett has not definitely determined his future plans.

As was to be expected, books on radio are now making their appearance. The D. Van Nostrand Company have just issued one under the title "Radio Phone Receiving," which is described as "A practical book for everybody." The various topics discussed are as follows: 1. How Radio Telephoning is accomplished; 2. Tuning the simple receiving circuit; 3. Receiving the waves by crystal detectors; 4. The vacuum tube; 5. Amplifying the music or speech; 6. Regenerative and Heterodyne reception, and, 7. Radio telephone broadcasting. The book is well illustrated, 180 pages, 4½ in. by 7½ in. in size, bound in green cloth. Price $1.50 net.

A New P & S device

The flat-back wall receptacle has gradually been losing ground because of the growing popularity of outlet-plates. These plates when used for new work, usually have a stud extending beyond the surface of the wall, and in old-house work the plate is set on the wall surface. Another cause is that outlet boxes, in general, are rarely set flush or true with the wall surface. Therefore the contractor has found it necessary to make up special brackets and canopies, where a wall receptacle would have been preferable and cheaper.



All metal BR base and socket

Pass & Seymour, Inc., Solvay, N. Y. have met this demand in their new "All Metal" BR base. This is an all-metal base for every conceivable form of concealed outlet: old work, loom plates, ceiling plates, boxes for metallic and non-metallic flexible conduit. It covers them all, and when combined with the various bodies, makes a full line of wiring devices. The standard finish of BR is brush brass. The bridge inside is a full inch above the skirt and this base will therefore cover any projection such as pipe-ends or studs that extend one inch from the wall of ceiling surface. A complete series of adapters has been developed to secure this base to all forms of outlets.

Allen Engineering Co. Activities

The Allen Engineering Company, Hamilton, has been retained to take care of the factory inspection and testing of the recent contracts let for the manufacture of the electrical equipment for the Manitoba Power Company. This same organization has just finished handling two very large contracts at Schenectady and Pittsburg for installation in Switzerland and France; the equipment consisted of 150,000 volt transformers, switching, insulation and line material. The Hydro-electric System of the City of Winnipeg also retained this company in a similar capacity for the recent extension to their power house, covering the inspection and testing of three 6,500 kv.a. generators, transformers and line material. Likewise the Laurentide Power Company has had this company look after their 2—18,500 kv.a. generators and switching recently shipped from Hamilton.

Northern Electric "Quality" Iron

The iron is without doubt, the most widely used electric appliance and there are so many types made and in use, that it is sometimes supposed the appliance is so perfect as to make impossible further improvements in construction or design. That this is not so, is claimed for the new Northern Electric Quality Iron. Its design is distinct, in many points, from that of any other iron made. It has a long torpedo shaped nose and extended back, making it more convenient to use both ends of the iron; it has round corners at the back which prevent catching and tearing ruffles, tucks, pockets, etc; the heel is rounded—valuable when ironing cuffs and collars, lace and other fancy articles; the handle is raised to conform to the natural position of the hand when ironing, and the whole iron is very carefully balanced. Another feature is the asbestos pad placed above the element, which directs and retains the heat in the bottom of the iron, requiring less current to operate. The heat is evenly graded from the hot point towards the back. There are also several mechanical features, including monel metal contact pins, which are very important in the life of an iron.

New Northern Electric Iron

The Cutter Company, Philadelphia, are distributing a booklet describing, with illustrations, a variety of remote control circuit breakers of both motor and magnetically operated types, together with other forms of apparatus especially adapted to central station requirements.

The latest model "Eureka" sweeper

Electric Railways

The Canadian Electric Railway Convention

Everything in Readiness for Meetings in Quebec City on June 1, 2 and 3

Very complete preparations have been made for the exhibit of electric railway equipment and accessories which will constitute one of the most important features of the Canadian Electric Ry. Ass'n. which meets in Quebec on June 1, 2 and 3. Thirty six booths have been fitted up by the Committee of Exhibits under the chairmanship of Mr. R. M. Reade, every one which has been taken, and the finest exhibit, devoted entirely to electric railway equipment, that Canada has ever seen, will be shown.

For the proper accommodation of these exhibits, the Drill Hall is being utilized. The session will be held upstairs in the same building. The officers of the Canadian Electric Railway Association are as follows: Honorary president, Mr. Thos. Ahearn, president Ottawa Electric Company; honorary vice-president, Mr. Geo. Kidd, general manager British Columbia Electric Railway Company; president, Mr. G. Gordon Gale, vice-president and general manager Hull Electric Company; vice-president, Maj. F. D. Burpee, manager Ottawa Electric Railway Company. Executive: The officers named above Messrs. R. M. Reade; Quebec; H. H. Couzens, Toronto; C. C. Curtis, Cape Breton; C. L. Wilson, Toronto; E. P. Coleman, Hamilton; A. W. McLimont, Winnipeg; W. S. Hart. Three Rivers, Que., and Col. G. C. Royce, Toronto. Mr. A. Gaboury is treasurer, and Mr. H. E. Weyman, auditor.

Mr. G. Gordon Gale, president
Canadian Electric Railway Association

Once more Canadian Electric railway men are reminded that this association is now no longer devoted solely to the interests of private companies. It is an association, in actual fact, of electric railway systems of Canada. The program indicates that some very helpful papers will be read and these will undoubtedly be followed by still more valuable discussions, but the best part of the convention is always the interchange of general information, resulting from meeting men in the same line of business in a social way. This Convention actually represents the first opportunity that Canadian electric railway men have ever had of all getting together. We suggest that every man who decides to take advantage will only be consulting his own interests. The Convention Program is given herewith, as is also the complete list of exhibitors:

PROGRAMME FOR C.E.R.A. ANNUAL MEETING

Wednesday, May 31st, 1922

3.00 p.m. Meeting of the Executive Committee. Preliminary meeting of Associate Members; Registration at Chateau Frontenac.

Thursday, June 1st, 1922

9.00 a.m. Registration at Drill Hall

9.30 a.m. Address of welcome by His Honor the Lieut. Governor Sir Charles Fitzpatrick, and His Worship Mayor Samson of Quebec, followed by an inspection of the exhibits.

Business Session.—Minutes of last meeting; Address of president; Report of secretary; Report of treasurer; Report of special committee; Appointment of nominating committee; General business; Inspection of exhibits.

1.00 p.m. Get-together luncheon, Chateau Frontenac, $1.50, Ladies, Members and Associate Members; Short address by prominent guest.

2.30 p.m. Valuation of Street Railway Assets. Their Maintenance and Depreciation. — By Dr. Louis Herdt, consulting engineer, Montreal. Discussion; H. E. Weyman. Levis County Ry. Co.

2.45 p.m. Sight seeing around Quebec by Trolley. (Ladies.)

4.00 p.m. The Modern Street Railway Motor. — By J. K. Stotz, Canadian Westinghouse Co. Discussion; W. G. Gordon, Canadian General Electric Co., W. R. McRae. Toronto Transportation Comm.

5.00 p.m. Inspection of Exhibits.

7.30 p.m. Association banquet, Chateau Frontenac, $5.00; Chairman, Honorary President, (Ladies, Members & Associate Members.)

10.00 p.m. Dancing; Band on Dufferin Terrace

Friday, June 2nd, 1922

9.00 a.m. Inspection of Exhibits.

10.00 a.m. Motor Busses and Trackless Trolleys. — By D. E. Blair, Montreal Tramways Co.

11.30 a.m. "The Romance of the Rail and Power," by courtesy of the Canadian Westinghouse Co.

12.30 p.m. Inspection of Exhibits.

2.30 p.m. Welded Track Joints. — By E. B. Entwistle, Loraine Steel Co., Johnstown, Pa. Discussion: W. F. Graves, Montreal Tramways Co.

3.30 p.m. Moving Picture Exhibit, by courtesy of the National Safety League and the Dominion Wheel & Foundries Ltd.

4.30 p.m. Trip to Quebec Bridge by Boat. Light Refreshments. (Ladies, Members & Associate Members.)

6.00 p.m. Inspection of Exhibits.

9.00 p.m. Annual Reception & Ball. $2.00, Chateau Frontenac.

Saturday, June 3rd, 1922

9.00 a.m. Inspection of Exhibits.

10.00 a.m. Unfinished business; election of Officers; trip to Montmorency Falls & Ste. Anne de Beaupre; trip to Saguenay.

List of Exhibitors

Canadian Railway & Marine World; Kenfield-Davis Publishing Co.; Canadian Westinghouse Co.; Ohio Brass Co.; Taylor Electric Truck Co.; Ottawa Car Mfg. Co.; Canadian General Electric Co.; Lyman Tube & Supply Co.; Dominion Wheel & Foundries, Ltd.; Railway & Power Engineering Corporation; National Pneumatic Co.; Nichols-Lintern Co.; Canadian Car & Foundry Co.; Witherow Steel Co.;. Consolidated Steel Co.; Canadian Street Car Advertising Co.; Don. M. Campbell, Mech Eng.; Transit Equipment Co.; McGuire-Cummings Co.; Cleveland Armature Works; Lindsley Bros., (Canadian) Company; The Tool Steel Gear & Pinion Co.; Allen General Supplies, Ltd.; Southam Press, Ltd.; Canadian Cleveland Fare Box Co.; Universal Lubricating Co.; The Arthur Power Saving Recorder Co.; Canadian National Carbon Co.; Standard Underground Cable Co.; Canadian Brill Co.; J. G. Brill Company; Eugene F. Phillips Electrical Works; Canadian Steel Foundries, Ltd.; Hunter Joint Block Co.; Chestham Electric Switching Device Co.; Nachod Signal Co.; United States Steel Products Co.; C. E. A. Carr Company; The St. Louis Car Co.; Dawson & Co., Ltd.; J. A. Everell Co.; Northern Electric Co.; Sarnia Bridge Co.; Ontario Safety League; Vickers Limited; The Electric Railway Journal; The Electrical News.

Locomotives for the Chilean State Railways

Fifteen Road Freight and Seven Switching Locomotives Under Way—Some Data on Designs and Specifications

Work on the electric locomotives being built for the Chilean State Railways is rapidly progressing. The cabs for the first eight of the fifteen road freight locomotives have been delivered by the Baldwin Locomotive Works to the Westinghouse Electric & Manufacturing Company for the installation of the equipment. There will also be seven switching locomotives.

An outline of the road locomotive is shown in an accompanying illustration. The cab is of the box type, carried on two articulated trucks, each having three driving axles with direct geared motors. The estimated weight is 226,000 pounds. The locomotives will operate at 3,000 volts direct current. This locomotive rates 1,680 h.p. at 3,000 volts and will be able to develop a maximum of 3,200 h.p. for short periods. With natural ventilation the locomotive will deliver for one hour a tractive effort 27,950 pounds at a speed of 22.6 miles per hour at 3,000 volts. The continuous capacity of the locomotive with forced ventilation is 20,880 pounds tractive effort at 24.8 miles per hour. The maximum speed is 40 miles per hour. The general dimensions and estimated weights of the locomotive are as follows:

Table 1
Dimensions and Weights of Road Freight Locomotives

Track gauge	5 ft. 6 in.
Length over buffers	49 ft. 10 in.
Length over cab	38 ft. 0 in.
Total wheel base	37 ft. 0 in.
Rigid wheel base	13 ft. 9 in.
Height—top of rail to cab roof	12 ft. 7 in.
Height—top of rail to clerestory	13 ft. 10 in.
Width over cab sheets	10 ft. 0 in.
Height of coupler	41 in.
Wheel diameter	42 in.
Weight of complete locomotive	226,000 lb.
Weight of mechanical parts	140,000 lb.
Weight of electrical equipment	86,000 lb.
Weight per driving axle	37,670 lb.

The road locomotives will operate over the 116-mile route between Santiago and Valparaiso and the 28-mile branch between Las Vegas and Los Andes. The heaviest grade is 2.25 per cent for 12 miles from Llai Llai to La Cumbre. The maximum curvature is 11 degrees. There are six tunnels in the electrified zone.

The present main line freight trains average 550 short tons. They are operated with a single steam locomotive, except on the heavy 12 mile grade southbound, and on a northbound grade, of 6.8 miles. On these two sections a steam helper is now used to maintain speeds of from 10 to 14 miles per hour.

One electric locomotive will haul a trailing load of 770 short tons in either direction between Valparaiso and Santiago without assistance except on the Tabon grade. On level tangent track the speed with such a load will be 35 miles an hour at 3,000 volts. The average running speed on the Tabon grade will be approximately 24 miles per hour. The time saved by the elimination of delay to take fuel and water and by the higher running speed will shorten the time of a trip from 4 to 5 hours in each direction.

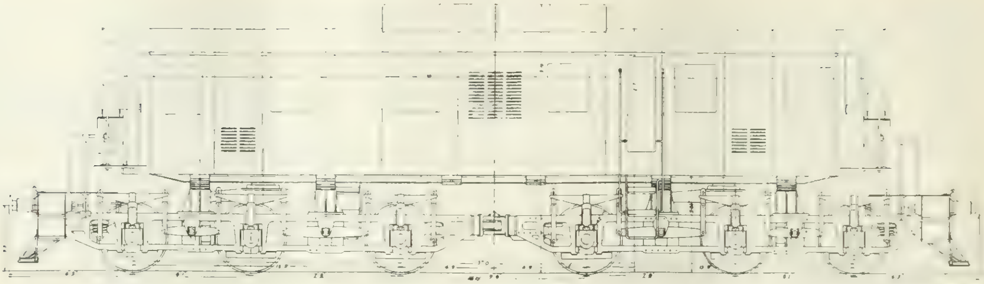
These locomotives are equipped with Continental spring buffers and M. C. B. couplers, arranged to take attachments for chain couplers temporarily. The two six-wheel trucks are connected at the inner ends by a mallet hinge. The bar-type cast steel side frames are located outside of the wheels and connected by cast steel bumpers and cross-ties. The semi-elliptic driving springs over the journal boxes on each side are connected to one another by equal beams. The ends of each set of three driving springs connected thus are attached to the side frames through coil springs.

The 38-foot box type cab, including an engineman's compartment in each end and a central equipment compartment, is carried on center pins located approximately over the midpoint of each rigid wheel base. One center pin is restrained both longitudinally and laterally and the other in the lateral direction only, which permits free longitudinal movement of the cab relative to one truck.

The locomotives are equipped with Westinghouse air brakes, the standard of the Chilean Railways. The air brake, type 14-EL is interlocked with the regenerative brake so that the latter may be supplemented by service application of the train brakes, if desired, without applying the air brake to the locomotive drivers.

Current is collected by spring-raised, air-lowered pantagraphs, controlled by compressed air and arranged to be mechanically locked in the lowered position.

Individual switches mounted in banks establish the main circuit connections. Each switch is a complete unit in itself and may be removed without disturbing adjacent switches. Compressed air controlled by electro-magnetic valves is used to operate the switches. For certain circuits where no current is broken and for low voltage, cam switches are used. These also operate by compressed air controlled by



General design of Freight Locomotive

electro-magnetic valves. The cam group comprises a number of switches mounted on a single shaft, connected through a rack and pinion to a double acting air piston.

Each axle of the locomotive is driven by a Westinghouse No. 350-D motor, wound for 1500 volts and insulated to operate two in series on 3000 volts. The nominal rating of this motor on short field is 280 h.p. at 155 amperes and 1500 volts. Field control is secured by the use of two separate field windings on the main poles. The motors are geared directly to the axles with a ratio of 3.94 to 1. The gear is of the flexible type.

A motor-generator set provides low voltage power to compressors, blowers, control equipment and lights. This set has a single frame and two armatures carried by a common shaft. The 3000 volt motor is a bi-polar double-commutator machine. The continuous rating of the generator is 35 kw. at 92 volts.

A master controller is located in each engineman's compartment to provide double end operation, the same master controller being used for both motoring and regenerative braking. This controller provides 50 control notches in acceleration so that tractive effort variations are small, thereby permitting exceedingly smooth handling of trains.

The control is Westinghouse HLFR providing speed combinations by varying the grouping of the motors to give one-third, two-thirds, and full speed. Field control gives three additional speeds. Transition from one motor combination to another is made by the shunting method.

For regenerative braking, the main motor armatures are arranged for the same combinations as when motoring and the motor fields are separately excited by the motor-generator set. The range of speed in regenerative braking will be from 8 to 30 miles per hour.

The Switching Locomotives

The switching locomotives, an outline of one of which is shown in an accompanying illustration, will be the last ones built. The cab is of the steel type and is carried on two swivel trucks. On each truck are mounted two motors driving direct through standard helical gears. The estimated weight is 136,000 pounds. The control is arranged for double end operation.

The nominal rating of this locomotive is 560 h.p. With 3000 volts, and natural ventilation, the tractive effort for one hour is 19,600 pounds at a speed of 10.6 miles per hour and the continuous capacity is 11,400 pounds at 12.7 miles per hour. With 25 per cent. nominal adhesion the starting tractive effort is 34,000 pounds. The maximum speed is 35 miles per hour. For short periods the equipment is capable of developing 1,000 h.p. In view of an expected increase in traffic these locomotives will be capable of handling trains of 1,200 short tons in yards with level tracks.

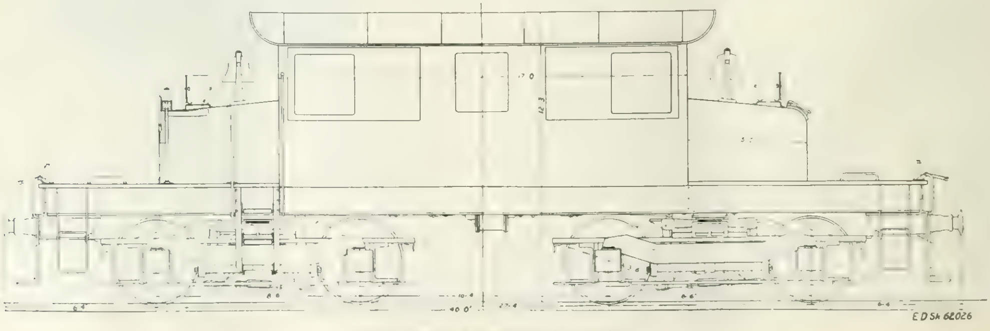
The following table gives the general dimensions and estimated weights of the locomotive:

Table II

Dimensions and weights of switching locomotives.

Track gauge	5 ft. 6 in.
Length over buffers	40 ft. 0 in.
Length over central cab	17 ft. 0 in.
Length over hoods	27 ft. 0 in.
Total wheel base	27 ft. 4 in.
Rigid wheel base	8 ft. 6 in.
Height—top of rail to cab roof	12 ft. 3 in.
Width over cab sheets	10 ft. 0 in.
Height over coupler	36 7/16 in.
Wheel diameter	42 in.
Weight of complete locomotive	136,00 lb.
Weight of mechanical parts	86,000 lb.
Weight of electrical equipment	50,000 lb.

The trucks are of the rigid bolster equalized type with rolled steel frames located outside of the wheels. A center pin is located at approximately mid-length of each rigid wheel base. The central cab has an engineman's stand in each end and control apparatus centrally located and suitably protected.



General design of Switching Locomotive

Current News and Notes

Ft. William, Ont.

The Fort William Electric Company has recently been formed and will carry on an electrical contractor-dealer business at 107 South May St., Fort William. The principals of the new firm are Mr. H. G. Earley, formerly of the Ft. William Pulp & Paper Company, and Mr. W. H. Cowley, formerly of the Spanish River Pulp & Paper Company. Mr. Earley & Mr. Cowley were attached to the 8th Battalion and the 58th Battalion, respectively, of the Canadian Expeditionary Forces and saw considerable service in France.

Hull, Que.

Mr. M. Gravell, 36 Laval St., Hull, Que., has been awarded the contract for electrical work on a store building being erected at 90 Main St., Hull, by Mr. Donat Paquin of that place.

Lachine, Que.

The general contract for a power house, to cost in the neighborhood of $22,000, has been let by the Lachine city council to Messrs. Fournier & Freres, 26 St. James St., Montreal, Que.

London, Ont.

The Private Bills Committee, of the Ontario Legislature, recently reported favorably on the London street railway Bill, which will enable the street railway company to charge a straight five cent fare instead of the present rate of seven ordinary tickets and nine workingmen's tickets for a quarter. Children under 12, will, of course, be allowed to travel on children's tickets. The Bill was amended, however, to provide that the rate of fare may be changed by the Railway and Municipal Board, should it be deemed advisable at any time, on the application of either the city council or the railway company.

Maxville, Ont.

Mr. R. J. Desjardin, Maxville, Ont., has been awarded the contract for electrical work on a new store being erected on Main St., Maxville, Ont., by Mr. W. D. Campbell, of that place.

Moncton, N. B.

Mr. Geo. W. McCall, 72 George St., Moncton, N. B., has been awarded the contract for electrical work on residences to be erected in various parts of Moncton, by the Moncton Housing Commission, at a cost of approximately $100,000.

Ottawa, Ont.

Contracts for the following equipment have been let by the Ottawa Hydro-electric Commission, Ottawa, Ont.: Transformers, Canadian Crocker-Wheeler Co., Ltd., St. Catharines; Meters, Ferranti Meter & Transformer Mfg. Co., Toronto; Wire, Messrs. Garvock & Goddard, Ottawa.

Mr. H. L. Allen, 272 Bank St., Ottawa, Ont., has secured the contract for electrical work on a $150,000 addition being built to the University of Ottawa, Ottawa, Ont.

Peterborough, Ont.

The city council of Peterborough, Ont., recently requested that the Ontario Hydro-electric Commission reduce the street railway fares from seven cents straight, to four tickets for a quarter. This request was not granted, the Commission pointing out that the volume of traffic did not warrant the reduction.

Point Grey, B. C.

Messrs. Farr, Robinson & Bird, 546 Howe St., Vancouver, have secured the electrical contract on a $40,000 residence being erected at 3590 Cypress St., Point Grey, by Capt. A. Montague Tulk.

Quebec, Que.

Mr. Fortunat Gingras, 34 St. Augustin St., Quebec City, has been awarded the contract for electrical work on a school to be erected at Signai & St. Sauveur Sts., Quebec City, to cost in the neighborhood of $75,000.

Riviere A Pierre, Que.

The Shawinigan Water & Power Company, Ltd., Shawinigan Falls, Que., contemplate the installation of an electric lighting system in the town of Riviere A Pierre, Que., in the near future.

St. Catharines, Ont.

The Clifford Electric Co., St. Catharines, Ont., has secured the electrical contract on an addition being built to a school in Orchard Park district, St. Catharines, by the trustees of Grantham S. S. No. 7.

St. John, N. B.

The New Brunswick Gazette announces the incorporation of the Maritime Radio Corporation, Ltd., with a capitalization of $24,000. The new firm will manufacture and deal in radio and wireless equipment. Head office: St. John, N. B.

Sault Ste. Marie, Ont.

Mr. R. C. Farmer, 36 Albert St. W., Sault Ste. Marie, Ont., has been awarded the contract for electrical work on a theatre on Albert St., Sault Ste. Marie, that is being altered into a store and apartment building for Mr. L. Palumbo, 124 Schrieber St.

Sherbrooke, Que.

M. J. A. Choquette, 125A King St. W., Sherbrooke, Que., has been awarded the contract for electrical work on an office building being erected by the city council, on Wellington St., Sherbrooke, at an estimated cost of $75,000.

Stratford, Ont.

The Bennington Electric Co., Stratford, Ont., has secured the electrical contract on a new Isolation Hospital, and an addition being built to the General Hospital, Stratford, Ont., at an estimated cost of $100,000. Also the electrical contract on the new Memorial Baptist Church being built at Downie & Norfolk Sts., Stratford.

Thessalon, Ont.

The ratepayers of Thessalon, Ont., recently voted favorably on a by-law authorizing the expenditure of $50,000 for Hydro-electric development, of approximately 200 h.p., on the Little Rapids of the Thessalon River.

Victoria, B. C.

Messrs. Hawkins & Hayward, 1607 Douglas St., Victoria, B. C., have secured the electrical contract on the Royal Jubilee Hospital recently erected in that city. It is understood the contract covers electric wiring, bells, telephones and fixtures.

Weston, B. C.

Mr. R. Simpkin, Weston, Ontario, has secured the contract for the electrical work on an apartment house recently erected in Weston, Ontario. This includes 5 suites of five rooms each, with electric ranges, and mantels.

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Electrification Data

A interesting publication just out is Westinghouse Electrification Data, Vol. III No. 2. In this issue the foreword points out that electrification of railroads is conservation, not only of material things, but also of human energy. This is followed by an abstract of a letter on Standards for Railroad Electrification addressed by George Gibbs to the Electrification of Railways Advisory Committee in England. This letter indicates that power should be developed at 25 cycles and the use of both alternating and direct current on the trolley continued.

The "Future of Railroading is Electrification" is discussed in the third chapter of the publication. Such important existing electrifications as the Hoosac Tunnel, the Norfolk & Western Railway, the Pennsylvania Railroad and the Chicago, Milwaukee & St. Paul Railway are cited as examples to prove this contention and a resume is given of the electrification plans of South American and other foreign countries.

The fourth chapter is descriptive of the electrification of the Paulista Railways of Brazil, outlining the reasons for the change in motive power and giving some detail of the locomotive equipment. Chapter five is a brief storey of the electrification of the Chichibu Railway of Japan, the Baldwin-Westinghouse locomotives purchased for this road forming the original introduction to Japan of American electric locomotive operation on an electrified steam railroad.

The last illustration in the book shows graphically the growth of steam railroad mileage electrified and electric locomotive tonnage in heavy traction service in the United States and Canada from 1905 to date.

The Diamond State Fibre Company of Canada Limited, have just issued a new catalogue (No. 20) on Condensite Celoron which fully describes its properties, gives technical data, etc., and is illustrated. This catalogue should prove of great interest to manufacturers who are looking for an absolutely waterproof material that will also carry out all the other functions of a vulcanized fibre material.

Pass & Seymour, Inc., Solvay, N. Y., have issued a bulletin under date of April 24, 1922, Form 1426, describing P. & S. standard Elexits. Complete instructions for properly installing side wall and ceiling outlets for Elexits are also given in Pass & Seymour Junior catalogue, No. 26.

NEW AND USED

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52	h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
50	h.p.,	3 ph.,	60 cyl.,	550 volts,	970 r.p.m
50	h.p.,	3 ph.,	25 cyl.,	550 volts,	720 r.p.m
30	h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30	h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25	h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m
15	h.p.,	3 ph.,	25 cyl.,	220 volts,	720 r.p.m
15	h.p.,	3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
13	h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
7½	h.p.,	3 ph.,	25 cyl.,	550 volts,	1450 r.p.m
7½	h.p.,	3 ph.,	25 cyl.,	550 volts,	725 r.p.m
7½	h.p.,	3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
5	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m
3	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3	h.p.,	3 ph.,	60 cyl.,	550 volts,	1120 r.p.m
3	h.p.,	3 ph,	25 cyl.,	550 volts,	1500 r.p.m.
3	h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2	h.p.,	3 ph.,	60 cyl.,	550 volts,	1750 r.p.m
2	h.p.,	3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
2	h.p.,	3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
1	h.p.,	3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
1	h.p.,	3 ph,	25 cyl.,	110 volts,	1420 r.p.m.
1	h.p.,	3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½	h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6	h.p.,	1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
1/6	h.p.,	1 ph.,	60 cyl.,	110 volts,	1150 r.p.m

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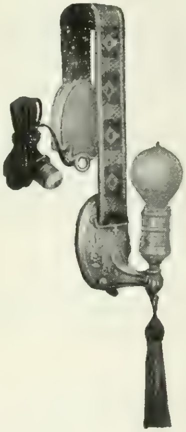

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Generation, Transmission and Application of Electricity

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Vol. 31 *Toronto, June 1, 1922* *No. 11*

A Uniform Standard A Great Aid to the Electrical Industry

The Canadian electrical industry will have to be more alert than ever or the efforts that have been made to improve the standard of electrical equipment and installations will go for naught. Reports from the United States indicate that a German-made electric iron has recently been placed on the market at a price which enables the retailer to sell it to the ultimate consumer at $1.00, complete with attachment plug and four feet of flexible cord. Mr. T. H. Day, president of the Western New England Association of Electrical Inspectors states that a recent test of these irons showed that every sample was more or less defective. The voltage to which the irons should be connected is not shown, but the tests indicated a wattage of 950. Mr. Day states that none of the samples remained in circuit long enough to permit the test to be completed, the heating element breaking down in from 3 to 35 minutes. When taken apart the device was shown to consist of a wooden attachment plug, a flexible cord considerably below standard, and a heating element of sheet-mica matrix wound about with iron wire, and very poorly insulated.

It is not surprising that some of these irons should percolate through into Canada, and we understand that a number of them—or something very similar—have appeared in the province of Quebec.

There is a Dominion Act to the effect that all goods imported into Canada must be marked with the name of the country of origin, but the Act has never been enforced and advantage has been taken of this fact to bring in irons and other equipment of inferior quality. It is a very serious matter, therefore, that, instead of enforcing this Act, Finance Minister Fielding, in his recent Budget speech, announces that the Act will be repealed, as the electrical industry had hoped that its enforcement would afford some measure of protection against cheap foreign goods being brought into Canada. It looks as if this situation might not have been thoroughly understood by our finance minister.

Another announcement in the Budget speech is to the effect that duty on goods coming in from foreign countries would no longer be based on their value in depreciated currency, the point being made that under this provision the German mark, for example, was given a value entirely out of keeping with its actual value and that as a result, instead of a duty of 35 per cent, Canada has been charging as high as 1,000 per cent.

These two items will have a direct bearing on the importation of German and other cheaply constructed electrical goods into Canada. However, to the layman, the argument that these goods are cheap will not carry so much weight as the argument that they are flimsy and hazardous to operate. Our safest course, therefore, appears to be the adoption of a universal, efficient system of inspection.

This brings us back to the question that has been discussed at some length in our recent issues. The province of Ontario is the only province, apparently, where these cheap, worthless goods cannot gain a foothold. The reason is that it has a compulsory inspection and standard requirements. If all the Canadian provinces had the same arrangement, it would be infinitely better for the electrical industry as well as for the people we are endeavoring to serve.

If the new Budget is thus the means of speeding up the activities of the electrical industry to the end that we may have a universal Code of requirements, and uniform inspection, it will at least have served a useful purpose. We believe, also, it would be well if the industry would take an immediate opportunity of pointing out to Mr. Fielding the unfair position in which we shall be placed by the provisions outlined in his Budget speech, as mentioned above.

* * *

Suggest Calling Conference of Provincial Representatives

At the last meeting of the main committee of the Canadian Engineering Standards Association, held in Ottawa, the secretary, Mr. R. J. Durley, reports that the work of the sub-committee on the Canadian Electrical Code was discussed and it was decided to forward to the Minister of Trade and Commerce a memorandum outlining the present situation in regard to this question, and request him to convene a meeting of representatives of the various provincial governments to discuss the possibility of interprovincial agreement, and acquaint the provincial governments with the difficulties now experienced by the electrical industry. The following resolution was unanimously adopted:

"RESOLVED that the Memorandum on the proposed Canadian Electrical Code be approved, and that the secretary be directed to forward it to the Minister of Trade & Commerce, calling his attention to the unsatisfactory situation at present existing in Canada due to the lack of uniformity in the requirements for electrical appliances and construction in the various provinces, and requesting the Minister to consider the advisability of calling a conference of representatives of all the provincial governments with this Association to discuss the matter with the view of obtaining interprovincial agreement and action."

The Application of Electricity in the Manufacturing Industry

A Typical Rubber Tire Plant, for Example, Uses Equipment Valued at Half a Million Dollars

By a process almost as imperceptible as it has been persistent, the industries of the world, small and great, purely local or of world-wide application, industries in their innumerable varieties, have all become dependent—absolutely tied hand and foot—to electric power. Think of the many industries that could not continue at all without electricity! Can you think of a single isolated case where, if not already used, electricity would not introduce economy, speed and refinements quite impossible without it?

It is often said that the percentage cost of power entering into the total cost of a manufactured article is so small as to be negligible. It certainly is so in comparison with its value to the industry it operates. But when considered from the point of view of dollars and cents, many of our manufacturing concerns are an exceedingly important factor to the equipment salesman. It is not at all unusual to find a half million dollars tied up, in an industrial plant, in transformers, motor-generators, motors, switching and other auxiliary equipment, with annual purchases of anywhere from $50,000 to $100,000.

With this issue we begin a series of articles more particularly designed to show the varied uses of electricity in the different industries. At the same time these articles will demonstrate the extent of the industrial field as a market for electrical equipment. The first article deals with the manufacture of rubber tires, and the Goodyear plant is taken as a type.—Editor.

The extent to which electricity is used and the effects which follow a cessation of its supply, in manufacturing, render not inapt its title "the life fluid of industry." The further carrying of the metaphor into the visualization of cables as arteries and of the power house as the heart of the whole system, is not strained; in fact, the similarity is but emphasized by the examination of a modern plant such as that of the Goodyear Tire and Rubber Company.

The principal factors considered in planning the factory layout were (1) the most efficient power distribution with the least apparatus, comprising the installation of the highest quality and safest equipment obtainable and at the lowest possible cost; (2) "safety first," that the entire system should comply with all safety requirements, and (3) flexible installation, adaptability of the system to changing conditions, motor re-location and future additions.

Power House

In this case the power house is of brick and steel construction. It is approximately forty feet high and is divided into four rooms, namely, the boiler room, 58 by 88 feet; pump room, 40 by 66 feet; motor generator room, 36 by 66 feet, and transformer room, 22 by 66 feet. Basements are included under the pump room and the boiler room. The plan is so arranged that future extensions can be made without interfering in any way with the operation of the present plant.

The roof is constructed of reinforced concrete, plastered inside, and embodies a supplementary layer of 2 inches of wood, to prevent sweating. Over this is laid four ply of felt, the latter being covered with slag. A monitor is carried, with apparatus for opening and closing the sash. Steel columns, concrete floors, steel sash and steel stairs are features that strike the eye of the visitor as indications of modernity and fireproofness,—in fact the building is considered entirely fire-proof.

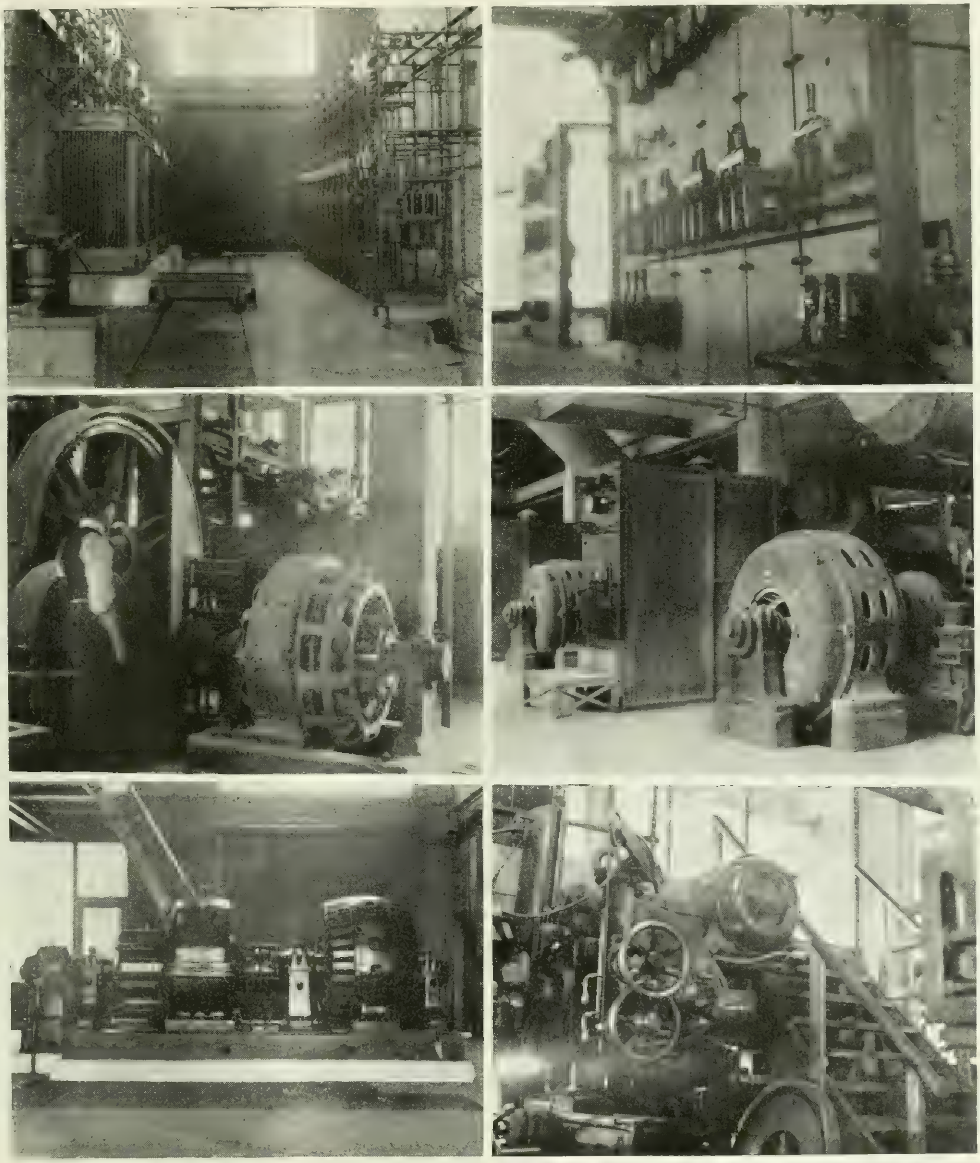
A conception of the quantity of electricity that enters this power house is rendered easier by the statement that many towns with hundreds of inhabitants do not require as much for their entire needs. The total consumption for April 24 was 29,000 kw.h. for 24 hours. This large amount of current is supplied by the Hydro Commission from a nearby sub-station, the lines entering the power house at the east end in the transformer room. The main disconnecting switches are installed immediately under the point of entrance of the lines to the building, and are operated from a gallery 25 feet above the main floor. The lightning arresters are of electrolytic type and are installed on the gallery floor.

Switchboard and Transformers

The 2200 volt switch structure supports a bus bar which feeds the oil circuit breakers for the 2200 volt feeders to the factory. Each breaker is furnished with a separate disconnecting switch. The bus bar is fed through a main oil breaker with no voltage release. All the oil breakers are d.c. controlled, the control switches being installed on a switchboard in the motor generator room. Lightning arresters are installed at the end of the switch structure for the protection of the switching equipment.

The greater number of the smaller motors used throughout the factory are supplied from a bank of four 150 kv.a. Westinghouse oil-cooled transformers. These are located in the same room as the power line inlet and take power from the high tension buses at 2200 volts, and feed various 550 volt

Modern Industry Owes its very Existence to the Application of Electric Energy



Typical views of electrical equipment in Goodyear plant.—Upper left—Transformers and bus bars; Upper right—Direct current switch board; Middle left—**75** h.p., d.c. motor, driving calender; Middle right—Mill line drive, **400** h.p., **2200** volt a.c. motor; Lower left—Motor generator set (for direct current supply;) Lower right—Individual motor drive on vertical milling machine.

circuits through their secondaries. The usual disconnecting switches are used.

Evidence of the skill with which the power requirements of the company have been foreseen and provided for, is given added illustration in the layout and equipment of that section of the power house which contains the switchboard, power-factor compensating and emergency equipment. A factory load naturally embraces a large number of small motors and in general the resulting power-factor is lower than either consumer or power company desires. The Goodyear company have solved this problem very efficiently by the installation of a Westinghouse synchronous motor of 510 h.p., which improves the power-factor anywhere from 15 to 20 per cent. and results in a considerable saving in power bills.

The synchronous motor is used to drive a d.c. generator of 1,400 amps. capacity, supplying various d.c. apparatus in the factory. Some of the rubber handling or tire making operations require the use of variable speed drive and it is apparent that d.c. motors are more suitable for this purpose,—a fuller mention of the d.c. applications will be made hereinafter.

A steam-driven, turbo-generator, d.c. set comprises the emergency equipment, and is of sufficient capacity (300 kv.a.) to handle the d.c. control apparatus and emergency lighting.

The alternating current switchboard is located on a gallery in this room and comprises nine panels. Individual lines are run from several heavy motors into this switchboard and each can be checked for power-factor and frequency through special meters. This arrangement enables the exact effect of intermittent load to be determined and though some mill operations are "born that way," so to speak, and no amount of adjustment can alter their nature, nevertheless it is worth while to know exactly what does drag down the power-factor. Phase reading jacks are embodied in each panel.

Besides the heavy motor lines, floor lines, elevator lines, factory lighting and incoming lines are represented on this switchboard, and four graphic meters are employed for the registration of voltage frequency, power factor and watts.

Direct current distribution is looked after by a switchboard of six panels, located on the same gallery as the a.c. switchboard. Each panel is equipped with the usual d.c. meters and control apparatus.

An air compressor is installed in the generator room and is driven by a 2,200 volt, 100 h.p., Westinghouse motor.

The supply of current for factory lighting is furnished by three 40 kv.a., 2,200 to 110 and 220, transformers.

Transmission to Factory

All the factory feed lines are enclosed in armoured conduit and pass from the power house through an underground duct to a brick cable vault in the basement of the main building. Provision for extension is again evident here, as the extra capacity provided will be sufficient for some years to come.

It may be mentioned here that even the steam end of the power plant is not able to get along without some help from electricity. The electric lighting is of course taken for granted, but looking a little further we find that in the basement of the pump room there is installed a motor driven, vertical, centrifugal bilge pump, which is used for raising all drains about the power house from a sump in the basement to the outside sewer. It is automatically operated, the electric control for same being installed on the main floor above.

Applications in the Mill

In dealing with the applications of electricity in a mill it would be other than usual to assume that the large motors, the heavy current users, were not the most important and the most interesting. It appears, however, that the sum total of power used by small motors is not greatly below that of the big fellows, and their aggregate influence upon the power factor is sufficient to warrant the greatest care in the choice of conditions, sizes, operation, etc.

Heavy Motors

The heavy motors, as mentioned before, each have individual lines to the switchboard and use a.c. current, at 2,200 volts. Their main use is on the mixing mills (machines which work the rubber up with various compounds by kneading it between large steel rollers) and the arrangement is such that the mill can be stopped in less than ⅛ of a revolution. This is accomplished with the aid of a magnetic clutch, the only break in a direct connection of the electric motor to the mill. It carries a brake on either side and is operated by a safety device. A control board with d.c. control is supplied for each mill. The mixing mill apparatus presents an imposing appearance and leaves an impression of power on the observer that is missing in the contemplation of more delicate machinery; one 400 h.p. motor is used to drive a set comprising three 60 in. and one 84 in. mills, and the total equipment of the three sets represents a big investment.

Application of Direct Current Motors

The sizable amount of power, that an examination shows to be taken by d.c. motors, as may be conjectured, is used on machines that require variable speed drive. It is well known that in the application of the alternating current motor to auxiliary drive, one of the chief problems has been the development of satisfactory equipment for variable speed service. The direct current motor has very satisfactory inherent characteristics for such application and its use in certain operations is almost essential; in the Goodyear factory, the major portion of the d.c. current is used for driving the calender machines which handle sheets of the rubber and require frequent variations of speed. Satisfactory results are obtained from the equipment, which consists of Westinghouse motors and Westinghouse and Cutler Hammer control apparatus.

Doubtless many of us have wondered how the various treads are produced on motor tires and have hazarded a guess that the process involves the use of some sort of mold. This is indeed the case, and the consumption of molds is such in this particular factory that it is found advisable to make them on the spot. The pattern of the tread on the mold is cut by a scriber very similar to a planer tool, carried on a swinging arm of a special machine. Naturally very sensitive control is required and this is furnished by a d.c. motor with suitable speed adjusting equipment. Another application of comparatively small d.c. motors is made on the tire building machines, which also require very sensitive control. In this operation the operator builds the tire, practically layer upon layer, and the necessary revolution of the whole is accomplished by the attached motor; the machine is being continually started and stopped, resulting in the contacts clicking all the time and convincing anyone that a d.c. motor, in this case, is the right thing in the right place.

A machine which gives certain fabric material a bias cut, is also equipped with d.c. drive. The same is applied to the "tubers," which mold bits of rubber into workable chunks. These latter are equipped with electrically heated dies. The slitting machines are also included in the d.c. motor drive category.

Grouping of Motors

An analysis of the various motor drives in the factory shows that some use is made of the group system in certain departments where a number of machines are placed that are easily adaptable to such an arrangement. In this regard a conservative judgment would dictate that the peculiarities of each case determine the choice of individual or group drive, the economy of first cost and the saving of space by the use of overhead motors being well known. An instance of this occurs in the tube room, where overhead motors, taking alternating current at 550 volts, are used, and in the machine shop; in the latter case, the boring mills have individual drive,

Several medium size ventilating fans are installed and are equipped with 5 or 7½ h.p., 550 volt, a.c. motors. A rather unusual ventilating feature is embodied in a horizontal fan which does most of that work for the second and third stories. This fan is enclosed in a built-in recess, and measures about 10 ft. in diameter. It is driven by a 35 h.p. motor and its installation has taken the hardship from some of the more dusty work.

Elevators

The supply lines for the elevators are run in to the switchboard and by this means a fairly accurate check of power consumption can be obtained. Five 29 h.p., 550 volt, a.c. motors are used for these purposes and the quantity of power that is used varies considerably. It is apparent that there are a great many variables entering into the question, such as the economy of operation, number of stops, weight carried, etc., hence the range of power consumption. An elevator may make as many as 20 miles of travel per day so that even in a day's time the total energy consumption is considerable. The elevators in this case have platforms of approximately 8 by 11 feet and capacities of 6,000 pounds. They are installed in towers built outside the main walls.

Total Motor Installation

The fact that electrical power is more efficient as a means of doing work than are hand methods is well demonstrated by the following list of installations in the Goodyear factory. The fractional horsepower motor has evidently come into its own in this case, as is evidenced by the fact that there are shown about 25 different uses for them. Their combined reactance is surprising, in fact it is somewhat of a standing joke with the power plant superintendent to put a power-factor meter on his lighting circuit for the benefit of visitors. The resulting reading is generally a longer way from unity than they expected, but he invariably clears the air with the explanation that he has about thirty fractional horsepower motors on the line.

The total connected load in the Goodyear factory amounts to 4,153½ h.p. (March 10, 1922,) including both d.c. and a.c. applications. The total is subdivided as follows:—

	Number	Voltage	Horsepower.
	32	110 a.c.	16
	34	125/250 d.c.	379½
	141	550 a.c.	938
	10	2,200 a.c.	2,820
Total	217		4,153½

It will be noted that of this total of 217 motors, by far the larger number are of the 550 volt a.c. type, and this fact is an indication of standard practice for industrial motors of medium powers.

The 32 fractional horse power, 110 volt a. c. motors are used for varied purposes as ventilating, driving sewing machines and peeling potatoes in the cafeteria. The 34 direct current motors, taking 125/250 d.c., and ranging from 1 to 50 horsepower, are used mainly on the calenders and tire building machines. Advantage is taken of the ruggedness of alternating current induction motors by their application to the great majority of the operations; there are 141 of these general utility motors, 550 volt a.c., ranging from 1 to 30 horsepower.

Lighting

Nearly all the factory lighting is carried out with 100 watt nitrogen-filled lamps. The greater part of the operations are such that a great intensity of illumination is not required and standardization is possible. Where any doubt exists, the problem is readily solved with the aid of a Westinghouse Foot Candle Meter, which gives direct readings.

Maintenance

The west end of the factory basement is devoted to a complete electrical shop and store room. A staff of 9 or more men is regularly employed on installation and maintenance, and the principle that this department works on is to eliminate breakdowns as far as possible by preventing their causes. The factory is provided with an Autocall system and by this means it is possible to call an expert to the scene of trouble in a very short space of time.

A very complete set of testing instruments is carried and the use of these contributes largely to the smooth running of the organization. A motor may be working underloaded or overloaded, or there may be some other abnormal condition, and unless tests are made, a burnout is the first indication of trouble. A proper set of instruments costs money but in the long run the results are worth while. The Goodyear company have portable a.c. and d.c. voltmeters and ammeters, with their necessary adjuncts of shunts and potential transformers, so that any current or voltage used in the factory can be measured. A polyphase wattmeter is also provided and a megger is available for testing for grounds and dielectric strength. A complete record of each motor is kept, which consists of a card index file, showing the rating, department, repairs, etc.

Repairs of the smaller apparatus are carried out at the factory, larger stuff has to be sent outside.

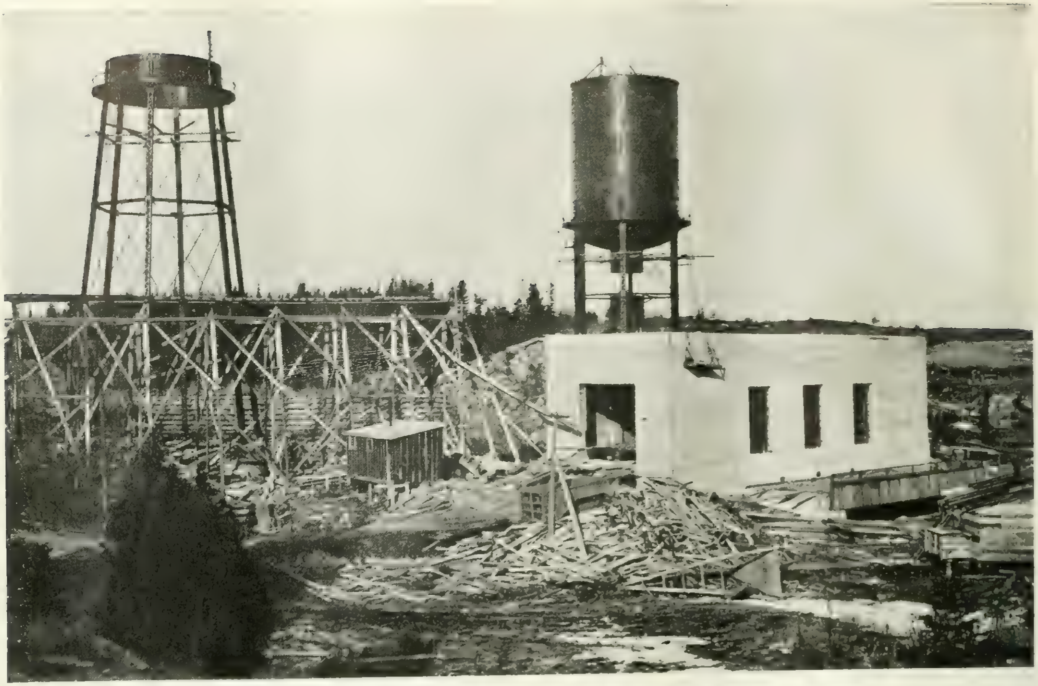
The overwhelming preponderance of electrical devices and the large consumption of power in this factory are signs of the times; electricity is a prime necessity of modern industry,—here we have an organization employing hundreds of persons and the functioning of the whole arrangement would not continue for a moment if its electrical power were cut off,

* * *

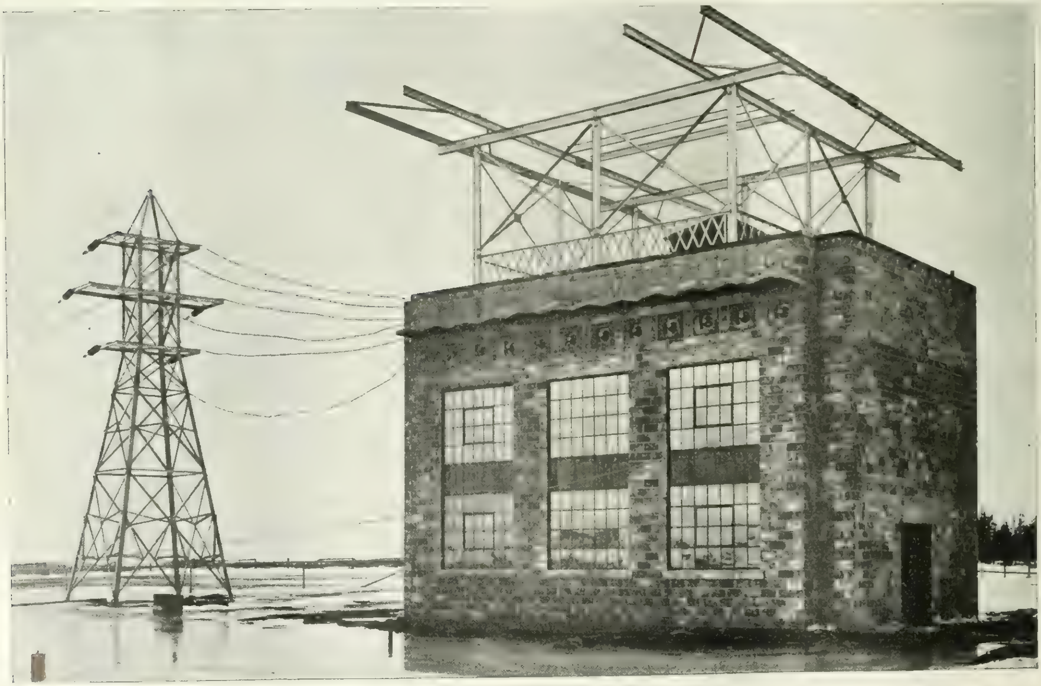
The Goodyear Rubber factory as described above is only one of a number in Canada, though it is one of the largest producers of rubber tires. Collectively, the tire industry is a field well worth cultivation by the electrical salesman. Below we give a summary of the capital expenditure and annual disbursements of the six largest tire factories in Canada. The total capital expenditure is almost two and a half million dollars and the sum total of annual purchases well over a hundred thousand. In active years, we know for a fact, this latter sum has gone very much higher—perhaps a quarter of a million. The following figures are exceedingly interesting. They cover, perhaps 90 per cent of the Canadian output:

Factory	Capital Value	Annual Expenditure	Annual kw.h. used
1.	$ 250,000	$ 12,000	4,800,000
2.	500,000	17,500	7,800,000
3.	630,000	73,700*	3,500,000
4.	500,000	15,000	5,000,000
5 & 6	500,000	15,000	5,000,000
	$2,380,000	$ 133,200	26,100,000

*Including charges for current.



Musquash Development—Generating Station and surge tanks, under construction



Musquash Development—Sub-Station at Fairville

New Hydro Plant in New Brunswick

Unique Installation Just Completed at Musquash River, Near St. John—Actually Two Plants in One—The Work of the New Brunswick Power Commission

The New Brunswick Electric Power Commission have issued an interesting report on the Musquash hydro-electric development, which has just been completed, describing and illustrating various phases of the construction and design of this plant. The Musquash River has three branches, known as the West, the East and the North-east, the East being centrally located between the other two. The station is located on the channel of the East branch, but only the West and the North-east branches have been developed. The plant is quite unique in design, therefore, in that two pipe lines, fed from rivers more than two miles apart, converge at a common point, combining to operate generators in the same power house.

The general plan is shown in the accompanying illustration. The working head at full load on the West branch is 117 feet, and on the North-east branch, 95 feet, after allowing for pipe line losses and tidal effects. Assuming 80 per cent. efficiency of generation, the first will develop 1450 continuous horsepower and the second 1550 continuous horsepower. The pipe line from the West branch to the power house is 8 feet inside diameter, 7,400 ft. long. That from the East branch is 10 feet inside diameter, and 2935 feet long. The latter will operate two turbines and the former one turbine, so that in the one power house there will be, practically speaking, two developments, providing a two-fold reliability and insurance against interruption.

East Branch Intake Dam

This dam, including the intake, is 1,500 feet long and has a maximum height of 78 feet in the channel. From the western end, 874 feet of concrete gravity section, including spillway, is built upon granite ledge foundation well across the stream to the high bank on the East side. From this point an earth dam with concrete core wall extends to the intake. This intake and core wall at both ends are on solid rock, and the central part of the core on good clay hardpan. East of the intake a concrete core has been carried one hundred feet into the natural bank and earth embankment graded There are 14,675 cubic yards of concrete in this structure and 15,350 cubic yards of embankment. The dam is provided with a stop log sluiceway eight feet wide to a depth below the level of the intake. This will permit of lowering the water to that depth, of running trash from the pond, and in the future, if any lumber should become available on the waters of the stream a log sluice can be built through the dam. There will be a pondage of 1,500 acres above this structure. The plant can be operated 24 hours continuously at average capacity, and this pond would be lowered less than three inches. It is not intended to depend on this pondage, however, for storage, except for daily regulations. Any considerable lowering of this water would reduce the head and consequently the power. Provisions have been made on the spillway of the dam so that two feet of flash boards can be placed during the decline of a flood. The water so impounded would be drawn down to further conserve storage.

To impound the water at the level of this dam eight earthen dams had to be constructed in various depressions near the lower end of the pondage. These, as well as the main structure, have been completed. 30,950 cubic yards of embankment were required for these side dams.

West Branch Intake Dam

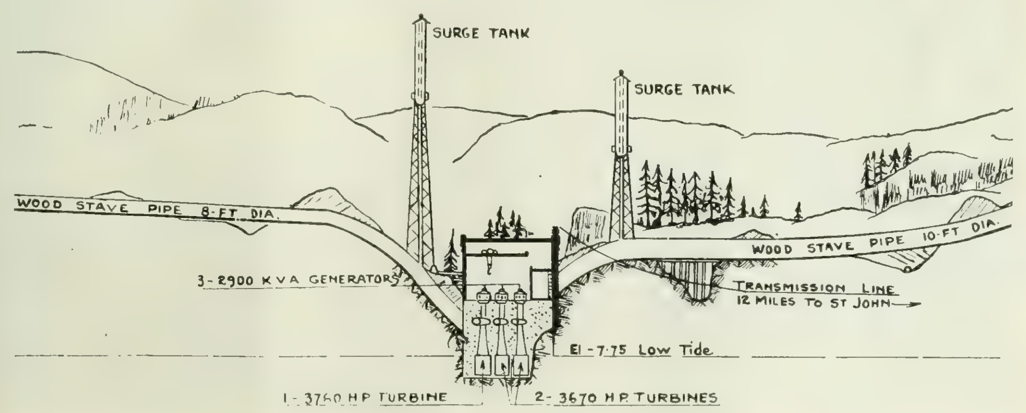
The main dam is located upon the site of the old driving dam, known locally as Scott Falls. A concrete overflow section 224 feet long is built across the stream bed. It is 55 feet high at the deepest point in the channel. On the East side an earth wing 1050 feet long has been constructed with a concrete core wall, and on the west side a similar construction 700 feet long, making the total length 1974 feet. There are 8432 cubic yards of concrete and 38,962 cubic yards of earth embankment in this structure. The water has already reached a level within four feet of the overflow and the structure appears to be 100% efficient thus far.

Three side dams were required in this case also. These were built of earth, rip-rapped on the water side, as are all the earth dams, and contain 21,463 cubic yards of embankment. The area of the pond will be 500 acres.

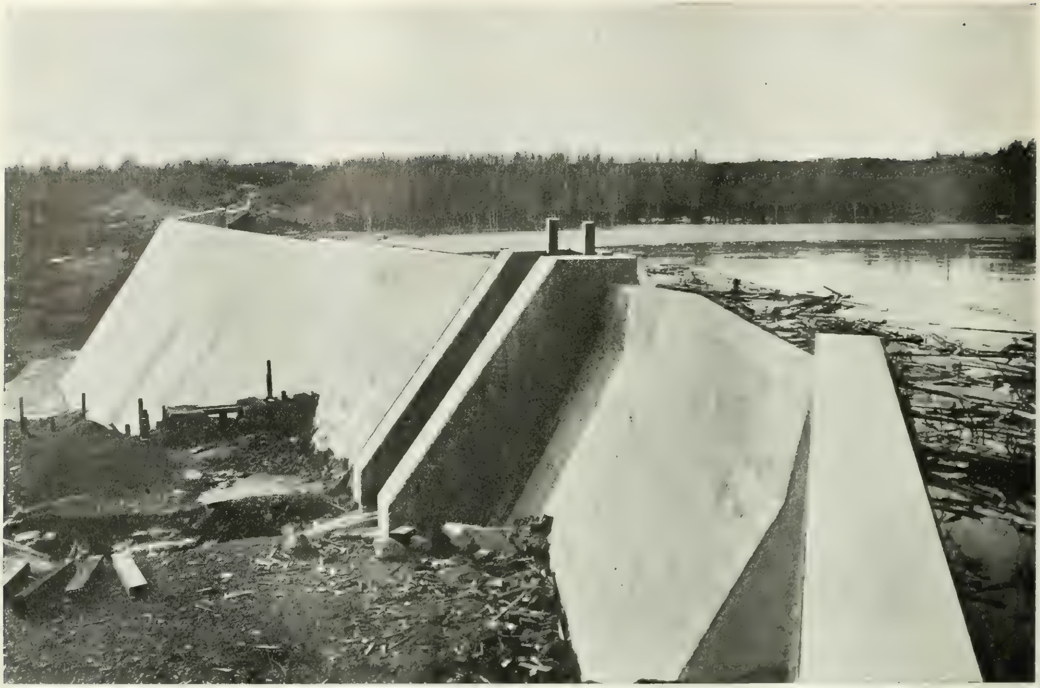
A canal 900 feet long extends from a point above the eastern end of the main dam to the concrete intake house located between two solid rock banks.

Storage Dams on the East Branch

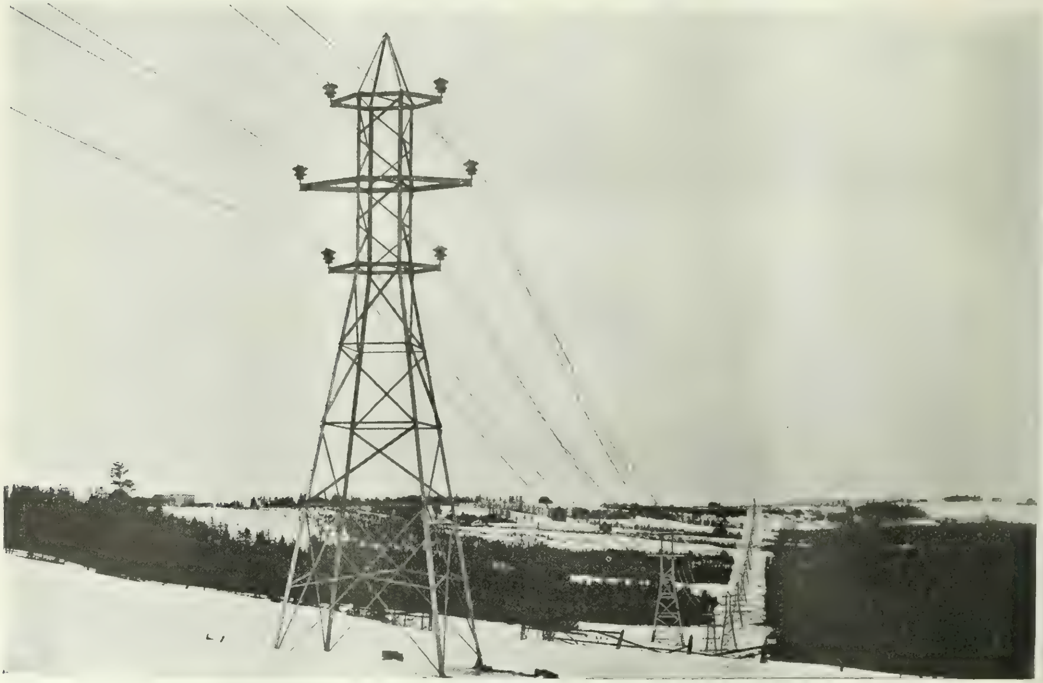
Dams at the foot of Loch Alva will raise the water 19



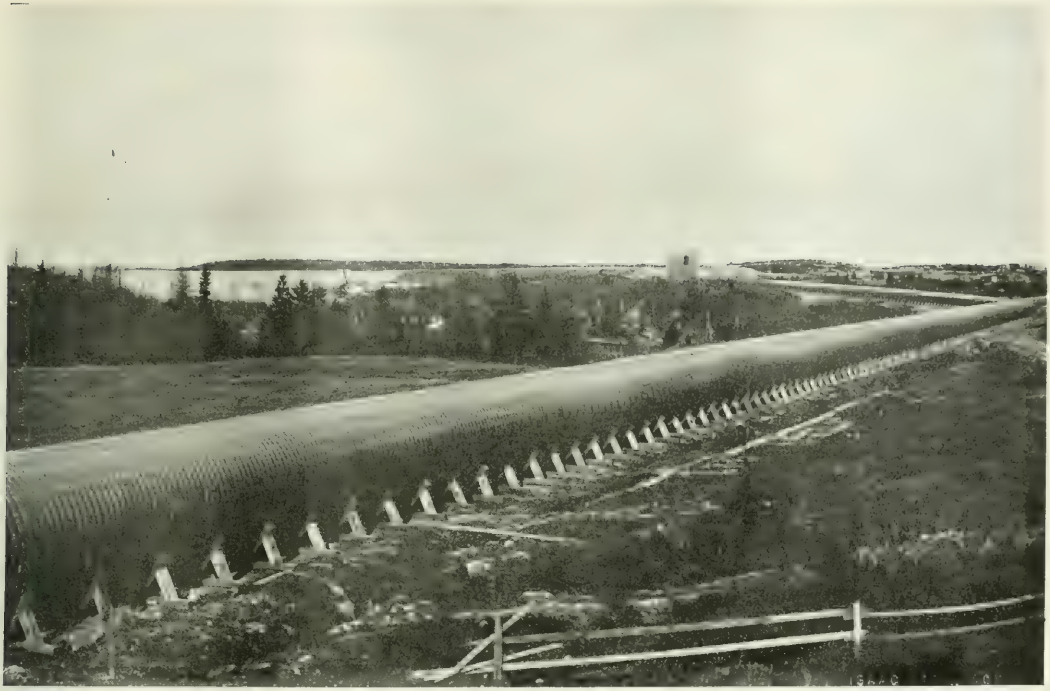
Profile of Musquash hydro electric plant showing how one power house is supplied by two pipe lines



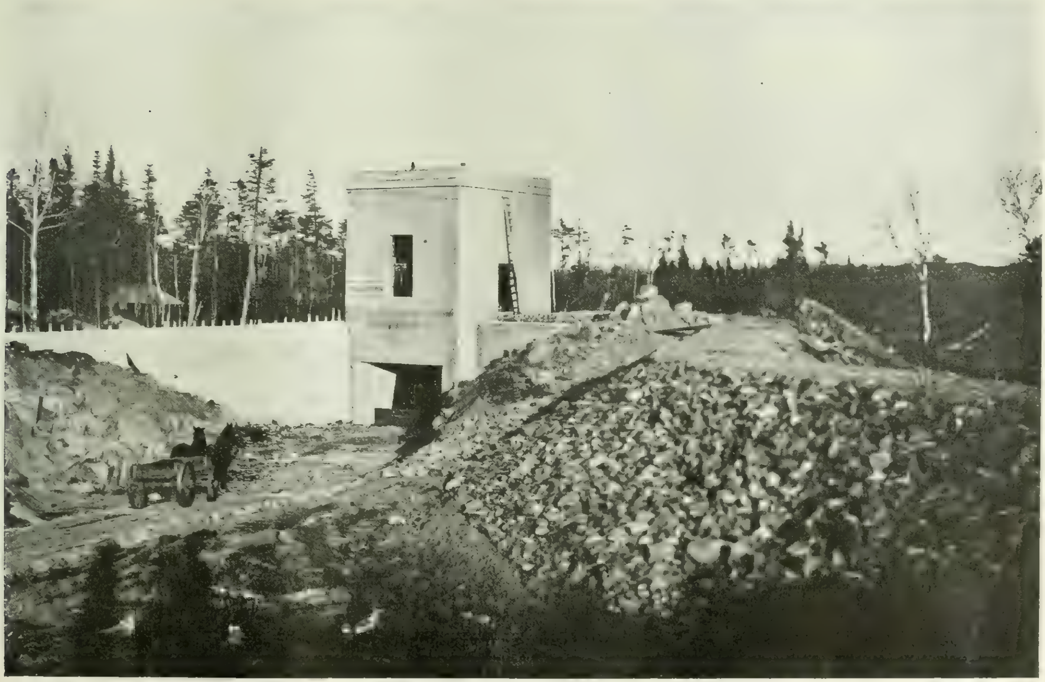
Musquash Development—East branch intake dam



Musquash Development—Transmission line



Musquash Development—View of east branch head dam, intake and 10-ft. pipe line



Musquash Development—West branch intake and gate house, under construction feet above summer level. The main dam is a timber structure, built on solid rock, and provided with spillway and two gates for regulating the flow. There will be 1,250,000,000 cubic feet of water impounded, enough to operate the plant at full capacity 83 days. Three side dams were necessary to close gullies near the lower end of the lake. In all four dams there are included 34,537 cubic yards of earth embankment, 3,723 cubic yards of rip-rap and 173,000 feet board measure of timber. The country adjacent having been fire swept several years ago, no timber was available at the site, and had to be hauled over four miles from the railway. The level of this lake has now been raised about ten feet and the dams are giving entire satisfaction.

Other storage sites on this stream which will be developed as required include: Eagle Lake, Deer Lake and Belvidere Lake.

Storage Dams on the West Branch

At Log Falls, just at the upper end of the flowage from the intake dam, a yellow birch timber dam has been constructed, thirty feet high and about 400 feet long. The timber was cut from Crown Lands nearby and sawn at the site last spring. Two small earth side dams were also built. Owing to the nature of the gravel bank on the West side some trouble has been experienced in getting a satisfactory connection between the structure and the natural bank, and a crew is now working to extend the structure further into this material.

There will be 900,000,000 cubic feet of water impounded in this flowage.

In these structures 6,121 cubic yards of earth embankment and 335,000 feet of timber are used.

It is the intention to construct during the coming summer a dam at the foot of Sherwood Lake, further up the West Branch, to store 650,000,000 cubic feet of water. There is in addition 300,000,000 cubic feet of storage that can be controlled at a low cost on Seven Mile Lake.

All the work on the dams now complete has been done by the New Brunswick Contracting and Building Co., Ltd., the intake dams under their first contract and the storage dams under a contract signed in February, 1921, after calling for tenders in the case of the Loch Alva Dams.

The Log Falls dam was awarded without tender, as the price of sixty dollars per M. feet for timber erected in place including stumpage rate and fastenings, was considered as low as could be expected. Furthermore it was essential that this work be undertaken promptly so that the timber could be hauled on the ice. As it turned out the last timber was hauled only a couple of days before the ice on the flowage became unsafe.

Intakes

At both the East and West head ponds solid rock was uncovered at the sites of the intake houses, particularly good conditions being found at the West Branch site where the intake house has been placed in a rock cut, only short wing walls at either side being necessary. Each intake is equipped, with an intake gate, operated by geared hoisting equipment at the entrance to the wood stave pipe line, trash racks of large area to prevent debris entering the pipe; and emergency stop logs at the mouth of the intake. These stops can be lowered into position or raised in their guides by a pair of travelling chain hoists suspended from runways attached to the roof I beams. The intake house may be dewatered, and repairs to the intake gate or filler gates effected. In the body of each intake gate are small filler gates, by which the pipe line may be filled before the intake gate itself is raised. The stop log chain hoists may also be used to withdraw sections of the trash racks for cleaning or repair, and sufficient floor space has been provided on the operating floor to allow of all stop logs being housed, when not in use, inside the building, so that minimum labor is required in handling. The windows are of steel sash, each window being provided with a ventilator.

Pipe Lines

The pipe lines from the intakes to the surge tanks near the generating station are constructed of B. C. fir wood stave, held by steel bands spaced at short intervals of a few inches. The staves are milled radially, so that when drawn up by the steel bands, the faces of the longitudinal joints press together, forming a perfect water tight joint. To prevent leakage at the butt joints the staves are notched and fitted with steel tongues. This also allows for slight expansion and contraction of the wood. The pipes are carried on wooden saddles laid on an even grade a considerable length of the latter, in the case of the West Branch pipe line, being of close corduroy where the sub-soil is marshy.

Surge Tanks

In order to prevent excessive variation in the pipe lines due to sudden increase and falling off of load on the generators, with corresponding change in the quantity and therefore velocity of the water at the turbines, each pipe line is connected near the generating station to a large surge tank of special design. The capacity of the tank on the East Branch pipe line is approximately 285,000 gallons, and that on the West Branch pipe line 215,000 gallons. The successful contractors for the supply and installation of these tanks and the steel pipe distributors between the tanks and the turbines were the Horton Steel Works, Limited, of Bridgeburg, Ontario.

Hydraulic and Electrical Equipment

The generating units are of the vertical type, the turbines and auxiliary equipment being supplied by the S. Morgan Smith Company of York, Pa., the governors by Messrs. Lombard of Ashland, Mass., and the generators by the Canadian General Electric Company of Peterborough, Ontario. Each generator is of 2,900 kv.a. capacity at 13,200 volts, and carries above it and directly connected to it on the same shaft, an exciter capable of supplying direct current sufficient to excite two generators. The provision of exciters of this capacity not only ensures continuity of service in the event of failure of one exciter, but also materially simplifies the regulation of the voltage of the generators.

Transmission Line

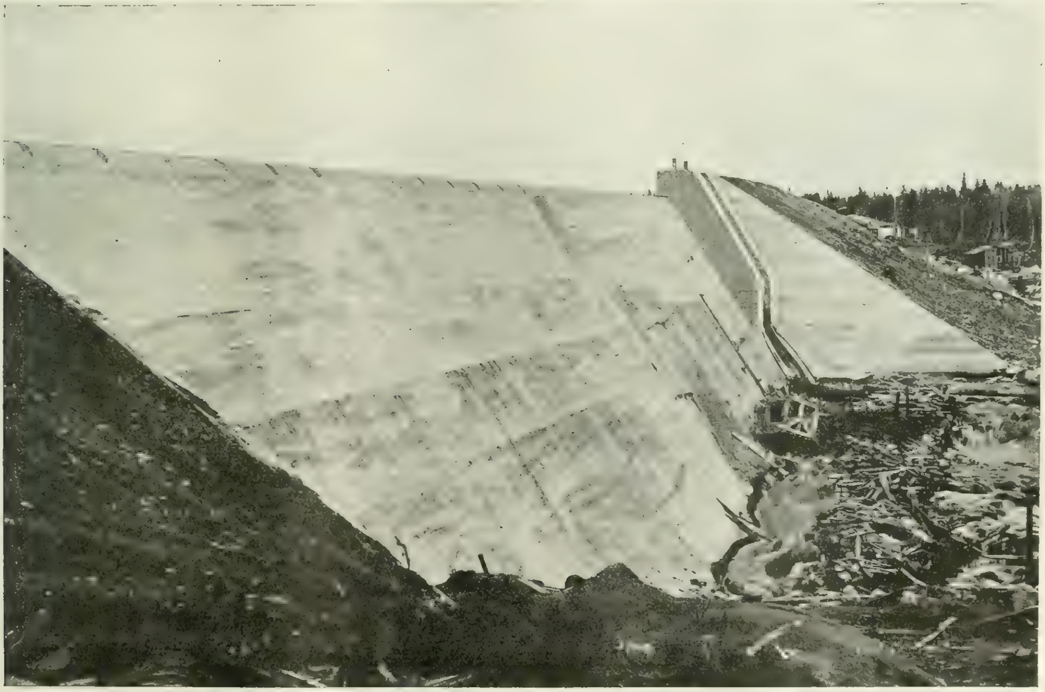
The transmission line consists of two separate circuits of aluminum cable, each circuit being of sufficient capacity to carry one-half of the maximum output of the generating station. These circuits are carried on fabricated towers of galvanized steel, erected on concrete footings where rock is not available.

The crossing of about one mile of muskeg presented some difficulty, and it was found necessary to drive piles to a depth of from fourteen to sixteen feet to rock or impenetrable strata, on which the concrete cap, constituting the footing for the towers, was poured in position. The spans for this portion of the line were increased to slightly over 1,000 feet to reduce the number of footings, and steel reinforced aluminum cable has been used in place of all aluminum. A special design of towers with a wide base was adopted at this point.

Fairville Switching Station

The switching station at Fairville, is built of granite-faced concrete blocks. A steel superstructure is mounted on the roof of the switching station to accommodate emergency air break switches, for the purpose of sectionalizing the transmission line in the event of trouble occurring, should the line at any future time be extended beyond St. John towards the east.

Musquash Development—General view of east branch intake dam and gate house



Musquash Development—West Branch intake dam; concreted overflow section

The History of the Development of Electric Welding*

By J. M. F. WILSON, B. Sc.

The arc fused metal is very much the same in both cases and hence we infer that very similar results would be obtained from both electrodes in practical welding.

Coated electrodes gave very much the same results, but did not include any of the covered electrodes on the market. Their specification for the coating paste was as follows:—graphite—15 grams; magnesium—7.5 g.; aluminum—4 g.; magnesium oxide—65 grams; calcium oxide—60 g.; sodium silicate—120 c.c., 40 degrees Be.; water—150 c.c. This was sufficient to coat 500.

Tests on the tensile strength of specimens made from the arc fused metal gave practically similar results (ultimate strength 50,000 lbs., from over 60,000 lbs. as electrodes and elongation fell from 14 to 8%) with properties very like low grade cast steel. Nothing was gained by coating the electrodes. Tests on specimens made from fused metal where the beads had been deposited across the piece instead of along the specimen showed a marked decrease in strength to 40,000 lbs.

Electrode Constituents—Their Effect

In view of the authority of the above results it is interesting to compare J. S. Orton's figures for two specimens (1) R, according to the Welding Committee's specifications, and (2) W, containing a much greater percentage of C and Mn. R would be very similar to B of the Bureau tests.

		C	Si	Mn	Tensile Strength	
"R"	Before	.17	.14	.57		% Composition before and after fusion.
	After	.12	.10	.23	57,300	
"W"	Before	.39	.12	1.01		
	After	.23	.02	.84	76,200	

Note the retention of C and Mn in the weld, and that the greater the carbon-manganese content in the electrode the greater the percentage left in the weld. Microphotographs showed a smaller amount of oxide and slag inclusions with the high carbon manganese wire and tests gave a much higher tensile strength (see above table). The ratio of C to Mn should be 1 to 3. Further tests by H. R. Pennington on electrodes with still greater carbon manganese content throw additional light on the subject.

	C	Mn	Analysis of a
Before	.85	11.2	deposit on mild
After (electrode neg.)	.63	8.11	steel boiler
After (electrode pos.)	.83	8.11	plate.

Note the greater loss in carbon with the electrodes negative, hence to retain the carbon it is usual practice to make the electrode positive with Mn electrodes. Depositing the same wire on a carbon steel rail gave in the analysis a reduction of carbon from .99 to .71 per cent. and Mn from 10.51 to 10.19 per cent., that is a smaller loss in manganese on the carbon steel rail than on mild steel boiler plate.

The electrodes were Wanamaker Coated Electrodes No. 9, the coating preventing vaporisation of the Mn and C constituents. These particular electrodes are designed for rebuilding worn rails, frogs and crossings, the deposit being applied diagonally to the traffic and finished up against a fire brick or carbon block on the flanged side of the rail. To take advantage of the peculiar properties of 12 per cent. manganese steel (e.g., sudden cooling makes the metal very hard and ductile, slow cooling makes it brittle) in track work, a small stream of water is directed on the deposited metal until the heat retained in the part will just dry or vaporize the water.

Tests of Mn bars showed that if heated for one hour to 2100 degrees F. and then "toughened" by cold water, they lost strength (93,200 lbs. breaking strength), while if heated for five minutes only and then cooled they gave a test of 157,250 lbs. (ordinary 12 per cent. Mn steel gives 108,500 lbs.) From this we infer that the time for the welding cycle (a few seconds when cooled by water) would not cause any structural change in the metal.

Automatic Welding

Automatic welding has been found to be adaptable to any form of weld from butt welding to deposition of metal on worn surfaces of shafts, wheels, etc. The speed of welding can be increased from 2 to 6 times that by hand. The weld is absolutely uniform and it has been found possible to weld any kind of steel from .1 to .55 per cent. carbon content. High speed tungsten steel has been successfully welded to cold rolled shafting, using Bessemer wire as electrode material. This kind of wire is considered as impossible for hand work, on account of sputtering, but it is just wires of this type which cut much more deeply into the work than Norway iron wire, with its quiet arc. In fact it is now possible to study the effect of the arc and the electrode without the personal equation. Some of the characteristics of the arc have been previously pointed out; for example, a certain degree of equilibrium between the fusing energy of the arc and the feeding rate of the welding strip is brought about, since a rise in current due to shortening of the arc will cause the wire to fuse more rapidly and thus lengthen the arc. But by making use of the increased voltage across the arc as the arc lengthens, an entirely automatic machine has been designed by the General Electric Co. This regulates the rate of feeding the electrode, which is now wound on a drum and gripped between a set of rollers connected through gearing to a small d.c. motor, the field of which is separately excited, and the armature connected across the arc, so that it will decrease in speed with the lower voltage due to a shortened arc, and increase in speed with the longer arc.

Position and Handling of Electrode

It is now possible to watch the arc for long periods and amongst the observations it has been found that a variation of 5 degrees in the inclination of the electrode will make all the difference to the success of the weld. About 15 degrees from the perpendicular produces good work and with some materials the electrode should drag or point towards the welded part. H. D. Morton points out that in spite of the fact that indicating meters show practically constant readings, oscillograph records show a succession of short circuits, due probably to globules of the molten wire between the electrode and the work, the voltage falling to zero with an increase in current. The longer the arc, the fewer the short circuits. With 1/8" electrodes and 150 amperes the globules are deposited at the rate of about two per second, as is also shown by ammeter records. As electrodes fuse at the rate of .2" per second, the electrode would have to be timed to be fed forward 1/10" after each globule to maintain a uniform arc length. The automatic machine is evidently able to respond to this.

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*This is the conclusion of an article the first part of which appeared in the April 1st. issue and which has been unavoidably delayed in publication.

Alternating Current Welding

This is a more recent method of welding, its development being no doubt delayed by the fact that most of the welding was done in railway shops where d.c. was available, and that an operator has to be capable of maintaining a much shorter arc than with d.c. and takes longer to train. Again, it was contended that 75 per cent. of the heat of the d.c. arc was developed at the positive terminal and therefore the welding could never be as good in a.c. work where the amounts of heat were equal at both terminals. However, in this city it has been shown that as good a.c. work as d.c. is possible and that the point of view of the difference of heat is very much a fallacy. Quoting from the Waters Arc Welding Corporation's pamphlet, of the three factors which go to make up the heat of the arc, (1) contact resistance between the arc and negative electrode, (2) resistance of the arc, and (3) contact resistance between the arc and the positive electrode in d.c. work, the resistance of the arc accounts for 95 per cent. Of the remaining 5 per cent., the positive electrode takes 75 per cent., or about 3¾ per cent., as against 1¼ per cent. at the negative. In the a.c. arc of course these amounts are equal, 2½ per cent. at each electrode, so that the extra heat developed at the work by the positive terminal of a d.c. arc amounts to very little.

The simplicity of the apparatus appeals also in its favor, the weight being about half the d.c., and the current control being obtained without any external regulating apparatus, a transformer of the leakage type being all that is necessary. It is claimed that the a.c. arc gives better penetration than d.c. Before the welding committee Mr. Wagner reported that the frequency of the circuit did not make much difference, arcs being held at frequencies ranging from 12½ to 500 cycles, but of course much more easily the higher the frequency. He also found the speed of a.c. and d.c. very much the same, and that bare electrodes gave excellent results.

It is, however, so much easier to hold the arc with flux coated electrodes that they are almost invariably used and as a coating of sodium silicate (water-glass) is easily available, these need not add greatly to the cost.

Operating Features of A.C. Welder

Against the a.c. welder it is contended that 170 amperes a.c. is required to give the same heating value as 140 d.c. and that the design of the transformer to produce a short circuit current equal to the normal welding current makes the p.f. as low as 25 per cent., hence the central station engineer is not likely to favor the type, but in these days of static condensers this ought easily to be remedied.

The recent three phase welders are attempts to equalize the load on the three phases and reduce the drop on any one phase of the system, but unless the welding transformer has some different characteristic due to its leakage factor it was demonstrated as long ago as 1892 by Steinmetz that it was impossible to take single phase power from either two or three phase systems and distribute the power equally over the several phases. On a three phase system one of the usual methods of producing single phase current is to connect two of the secondaries of the three transformers in open delta and join them in series with the third in reverse delta. Analysis by vectors will show that this simply results in putting a single phase load on two of the mains with the current in the third zero, gaining nothing over a single phase connection and losing much in simplicity and efficiency.

Another point put forward against the use of a.c. is the high voltage on open circuit causing a life hazard. On one tested in the city this was 135 volts, but there are now available on the market transformers like the Electric Arc Welding Company's which provides an auxiliary coil to limit the voltage to about 40 volts until the arc is struck.

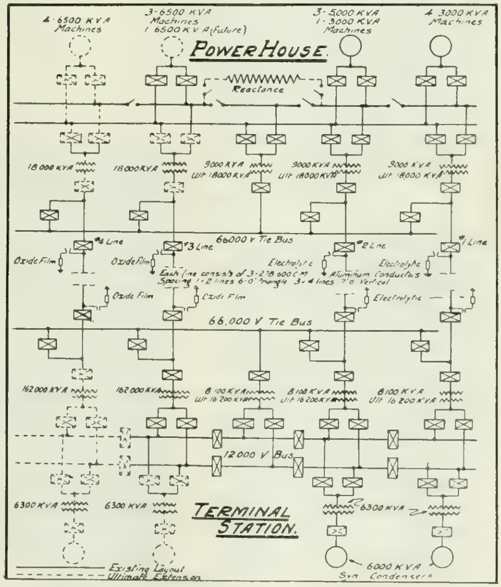
Conclusion

I have tried to indicate briefly the three prime factors for successful welding, (1) equipment (2) material (3) skill. As regards the equipment I have shown that it is essential to have a machine which responds quickly to the rapid changes in the resistance of the arc, and that a.c. equipment is as successful as d.c.

As regards material there must be relationship between the electrode and the work; that as the electrode arc process is essentially a casting, whatever is used must be treated to respond to the characteristics of the material; for example if it is a high percentage manganese steel that is used it must be given the same treatment a manganese casting would go through (rapid cooling, etc.), and it must be protected from the action of the atmosphere by coatings which will not allow its physical characteristics to be altered in its passage through the arc.

Finally as regards skill, not only do we mean the handling of the job by men of steady nerve, but the supervising skill to know that the weld is a good one, and the services of a welding engineer not only to select the proper material for the work, but to attend to the weld designs from a previous knowledge by test and research.

An instance of the resourcefulness of the radio fans was picked up only recently. A "radiophone party" was made up at a Vancouver home for an evening session, and while the necessary telephone equipment was on hand, no aerial or house wiring had been put in. The expert of the party "hooked on" to the wire clothes line running to a high pole in the back yard, and in spite of the fact that it had been raining a few hours before, very good results were obtained.



Wiring diagram of the Winnipeg Hydro Municipal System

Problems of the Industrial Engineer—III

Explaining to the General Manager the Different Methods for Correcting the Power-factor

By GEO. L. MACLEAN, E.E.
Electrical Engineer Canadian Connecticut Cotton Mills Ltd., Sherbrooke, Que.

"There are four methods used to correct low power-factor," said the Engineer to the General Manager, who was asking how the low power-factor of his plant could be corrected.

"The phase modifying system, which has many disadvantages and consists of supplying a proper voltage to the collector rings of a phase wound motor is undesirable for many engineering reasons; this system is more generally used in European countries than here. A rotary convertor can also be used for power-factor correction but we will discuss the two most practical and common methods which are with (1) a synchronous motor, sometimes called a synchronous condenser or synchronous compensator, which is a revolving machine, and (2) a static condenser, which is stationary and although working on a different principle furnishes the same results.

"To illustrate how this correction can be brought about we will have to use a few simple diagrams. Assume our load to be 500 kw. at 75% power-factor and that we wish to raise the power-factor to 90%. In Fig. 1, the line BC represents our 500 kw. To find out what our wattless current, represented by AC, equals, we must first find out what our kv.a. load is, represented by AB. Our power-factor is 75%; then the line AB equals 500÷.75 or 666 kv.a., or we are supplied by the power company with 666 kv.a. to enable us to use 500 kilowatts. We must now find out what AC is, and this determined from the relation $AC = \sqrt{AB^2 - BC^2} = 450$ (approx.)

Fig. 1

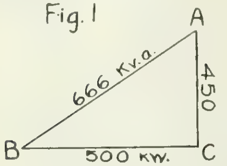
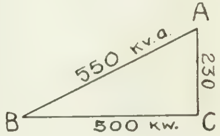


Fig. 2



"In Fig. 2 we will have to find out the wattless energy of our 500 kw. load at 90% power-factor. Proceeding as before, AB now equals 550 kv.a., or at 90% power-factor the power-company are supplying us only 50 kv.a. over our 500 kw., but at 75% power-factor they are supplying us with 166 over our 500. I am explaining this so you can see how and why the change in power-factor affects our cost of power. In this case AC equals 230 wattless energy. A little study of these two figures will show that by cutting down our wattless energy we also shorten the line AB, which decreases the angle ABC.

"Getting back to our calculations,—we must supply to our system a component equal to the difference between our wattless current at 75% and 90%, or 450−230=220, or we will have to impress a leading kv.a. of 220 kv.a. on our system.

"Our first step must be to consider costs. Will the saving overbalance the cost, maintenance, depreciation, and interest on money invested in an apparatus to correct this power-factor? We will assume that it does.

"We will install a synchronous motor. If a synchronous motor is used instead of a static condenser, although the calculations are the same for the one as for the other, the motor will take the place of the large induction motor now driving the air compressor. It must, however, be large enough to supply mechanical power to the compressor and not take full load current, for we will have to run this motor with an over-excited field and take full load current on the machine, but not full mechanical load, for the machine has also to supply a leading kv.a. of 220 to the system.

"A synchronous motor is practically a generator, although some changes will have to be made to meet conditions of the system. It requires an experienced attendant and, unlike an induction motor, is not flexible on the line, as any unusual conditions cause it to fall out of step and shut down, whereas an induction motor will adapt itself to voltage and frequency changes.

"Static condensers are stationary, and first cost per kv.a. runs higher, but their shortcomings are somewhat offset by the following facts: (a) low losses, (b) no rotating part, (c) less attendance, (d) operates at a low temperature, therefore, does not heat up operating room, (e) can be easily put on or taken off line. Indications from the number of static condensers under manufacture are that they may replace the synchronous motor as a power-factor corrector."

The G. M. on bidding the Engineer good day authorized him to purchase the necessary equipment for correcting the low power-factor.

Largest High Tension Oil Circuit Breakers

The Westinghouse Electric & Manufacturing Company has just shipped to the Pacific Gas & Electric Company an oil circuit breaker for the 220,000 volt Mt. Shasta development; it is for use on a 220,000 volt system having a solidly grounded neutral. The breaker is good for a 350 kilovolt wet test. The gross shipping weight, including oil, is 90,000 pounds. The net weight of the unit, erected on foundation, is 75,000 pounds. The breaker requires 2,000 gallons of oil for each pole and the net weight of the breaker, exclusive of oil, is 30,000 pounds. The height of the breaker from the ground to the top of the bushing is 17 feet, 6¼ inches, and its height from the ground to the top of the tank is nine feet, 8½ inches. The long diameter of the tank is eight feet while its short diameter is five feet, eight inches.

Home Made Radio Outfits

The Department of Commerce, Bureau of Standards, Washington, D. C., has prepared a circular, No. 120, entitled "Construction and operation of a simple home-made radio receiving outfit." This is for radio communication on wave-lengths between 600 and 200 metres, from high powered stations within fifty miles. The set may be constructed by anyone from materials which can be easily secured, the total cost of the equipment not exceeding $10. A single circuit with a crystal detector and an inductor, variable by steps, is used. Instructions are given for the construction of the detector, inductor, necessary switches, antennae and other parts. Certain parts, such as telephone receivers, must be purchased. Directions for operation are also given. Anyone interested may obtain a copy by sending five cents to the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Nesbitt Electric Mfg. Co., formerly located at 95 King St. East, Toronto, are now established at 27 Melinda Street.

32nd Annual Convention of the Canadian Electrical Association to be held in Chateau Laurier, Ottawa, June 15, 16 and 17

Bigger than ever, more instructive and interesting than ever and better than ever, is the aim of the Executive and members of the C.E.A., in regard to their 32nd Annual Convention.

President Julian C. Smith and secretary Eugene Vinet, are still busy rounding off all arrangements for this convention, which is to take place in the Capital city, though the informal dinner and dance on the second night of the convention is scheduled to take place on the "Quebec side of the Ottawa River."

A large turnout of members is assured due to the splendid programme and interesting subjects to be placed and discussed at the convention; also because there is prevailing a general feeling that with the improving business conditions it is necessary for the leaders of the electrical industry to get together and mutually consult on expansion and improvements in carrying on the service from all points of view.

The Executive extends an invitation for plenary sessions to all those who are interested in the development of the electrical industry in Canada; the Electrical Co-operative Association, Province of Quebec, is sending out special announcements to all its members calling their attention to this convention and urging their presence.

Besides the following tentative programme, the Executive of the C.E.A. expects one of the best internationally known men in the electrical industry on the North American continent as a speaker:

Thursday Morning June 15th, 1922

Registration (Chateau Laurier)

General session, President Julian C. Smith in the chair.

Official opening by Mayor Plante.

President's address

Report of Secretary and Treasurer

Report of Membership Committee

Chairman: M. K. Pike, Northern Electric Co.

Report of Public Relations Section

Chairman: J. B. Woodyatt, Southern Canada Power Co.

Short Executive Session for Representatives of Classes "A" and "D" Members.

Luncheon at Chateau Laurier

Officers of the Canadian Electrical Association 1921 - 22

P. T. Davies, 1st Vice-Pres.

Eugene Vinet, Sec.-Treas.

L. W. Pratt, 3rd Vice-Pres.

Julian C. Smith, President

A. P. Doddridge, 2nd. Vice-Pres.

Thursday Afternoon June 15. 1922

Report of Commercial Section
  Chairman L. W. Pratt, Hamilton Cataract Power Light & Traction Co.
Industrial Lighting—J. H. O'Hara, Ottawa Electric Co.
Power Sales—P. R. Labelle, Shawinigan Water & Power Co.
Merchandising —Geo. L. Atchison, Southern Can. Power Co.
Talk by Mr. Webster & Exhibits.
Group Photograph in front of Parliament Bldgs.
Visit of new Parliament Buildings.

Thursday Evening June 15th. 1922

(Normal School or Russell Theatre)

Illustrated Lecture on "Illustration" by D'Arcy Ryan. Mr. Ryan is one of the greatest authorities on illumination, approximately $30,000 have been spent for the preparation of that lecture which is a most gorgeous affair. We urgently request that every delegate should attend this part of the programme and bring his friends also.

Friday Morning June 16th. 1922

Report of Technical Section
  Chairman. R. J. Beaumont, Shawinigan Water & Power Co.
Report of Meter Committee
  Chairman: E. Holder, Shawinigan Water & Power Co
Report of Electrical Apparatus Committee
  Chairman: J. S. H. Wurtele, Southern Canada Power Co.
Underground Systems Committee
  Chairman: L. A. Kenyon, Mtl. Lt. Ht. & Power Consl.
Report of Overhead Systems Committee
  Chairman: A. P. Doddridge, Quebec Rly., Lt., Ht. & P Co. Limited.
Report of Hydraulic Power Committee
  Chairman: R. M. Wilson, Mtl. Lt. Ht. & Power Consl.
Report of Inductive Interference Committee
  Chairman: J. H. Trimingham, Southern Can Power Co.
Report of Lamp Committee
  Chairman: Watson Kintner, Can. Westinghouse Co.,
Adjournment
Luncheon

Friday Afternoon, June 16th, 1922

Report of Accounting Section
  Chairman: Lt. Col. D. R. Street, Ottawa Electric Co.
Report of Accident Prevention Committee
  Chairman: Wills Maclachlan, Consulting Engineer Toronto.
Address by Chas. Scott, Manager Bureau of Safety, Chicago.
Report of Rural Lines Committee
  Chairman: P. T. Davies, Southern Can. Power C.
Half an hour allowed to view various exhibits.
Trip by Tramways along Ottawa Valley.
Informal Dinner and Dance at Golf Club (on the Quebec side of the Ottawa River).
  Speakers: Laurence W. Davis; Walter H. Johnson, 1st V. P. of N. E. L. A.

Saturday Morning June 17th, 1922

Executive Session for representatives of Classes "A" and "D" Members.

Laurence W. Davis, Special Representative of the National Electrical Contractor-Dealers' Association, who is scheduled to speak at Friday's dinner, coming from New York purposely for that occasion, will address, on Monday, June the 19th., the electrical contractor-dealers of Montreal on the problems facing the electrical contractor-dealer and ways and means of meeting them. The Montreal meeting will be held under the auspices of the Electrical Contractor-Dealers' Association, Province of Quebec, Inc., and the Electrical Co-operative Association, Province of Quebec.

Economic Electric Power Transmission

The British Aluminium Company, Ltd., are sending out from their Canadian office, 265 Adelaide St. W., Toronto, a very attractive bulletin, No. 175, entitled "Economic Electric Power Transmission." It contains some 50 pages of highly interesting and educative matter printed in a most attractive form and splendidly illustrated. The front page deserves particular mention, being a scene of a section of an Ontario Hydro high tension line, taken on a very windy day, the photo being captioned "Aluminium conductors withstanding severe weather conditions in Canada." The bulletin is in effect, a text book on aluminium.

Electricity in Moving Pictures

Mr. W. Marshall, manager of a motion picture film exchange, well known in Western Canada, was the luncheon speaker at the Electric Club, Vancouver on April 21st. His topic was the great proportions to which the motion picture industry had attained and in developing it he stressed the value of electric energy and the many uses to which it was put in creating special effects and in producing the pictures. In the United States, he said, there are 18,000 motion picture houses and in Canada 900. The total number of people in the audiences of these theatres was 13,000,000.

Quebec R. L. H. & P. Co. Installing Ten New Cars

The Quebec Railway, Light, Heat & Power Company, Quebec City, Que., are placing in operation, beginning about June 1st., ten new street cars, manufactured by the J. G. Brill Company, Philadelphia. These will be used on the city street railway division. The cars have been built according to the following specifications:

Seating capacity, 40; weight, car complete, 36,000 lbs.; length over body, 28 feet; length over vestibules, after alterations, 40 feet; width over all, 7 ft. 10 in.; body, wood; roof, Monitor type; underframe, wood; cables, Quebec Railway; air brakes, Westinghouse S.M.E.; car trimmings, Quebec Railway; control, Single End, K-35-G-2; fenders, H.B. Life Guards; motors, 4, 101-B2; gears, Nuttall; gear ratio-15-69-5" face; seating material, Rattan; seats, Longitudinal; heaters, Con. Car Heating Co.; gongs, Brill, "Dedenda"; hand brakes, Peacock; hand boxes, Brill "Dumpit"; hand straps, Ricco Sanitary; headlights, Crouse-Hinds.

Coming Conventions

Canadian Electric Railway Association, at the Drill Hall, Quebec City, Que., June 1-2-3.

Canadian Electrical Association, at the Chateau Laurier, Ottawa, June 15-16-17.

Association of Municipal Electrical Utilities, at the Clifton Hotel, Niagara Falls, Ont., June 22-23-24.

American Institute of Electrical Engineers, at the Clifton Hotel, Niagara Falls, Ont., June 26 to 30.

F.A. Rose Passes

The electrical industry has heard with regret of the death of F. A. Rose, of the firm of Rose & Ahearn, electrical engineers and contractors, Toronto. Mr. Rose was with the Canadian General Electric Company for over sixteen years, previous to going into business on his own account. He had travelled the country extensively and was one of the best known men in the trade.

BETTER MERCHANDISING

Better Merchandising and Cost Keeping

"The Electrical Dealer is a Poor Credit Risk" Why? "He Doesn't Know His Costs"

There are many electrical merchants with very hazy notions of the cost of doing business. Most of them will admit that they ought to keep track of their costs and advance as a reason for not doing so such an excuse as "Have no time myself and can't afford a bookkeeper." This, of course, applies only to the man in a small way of business. Undoubtedly, there are many one-man businesses that cannot bear the expense of a clerk for the sole purpose of keeping accounts—but at the same time this is the very type of retailer who can least afford to be without a knowledge of his costs. The solution is for the owner to do the work himself—recognizing it as indispensable—or employ on his staff a man or woman who can handle, or learn to handle, the job as part-time work.

The inroads that are made by department stores and hardware stores on the legitimate field of the electrical merchandiser are due, in considerable degree, to the latter's poor trade rating, which in turn is the result of inefficient cost-keeping. It is needless to repeat here the oft-quoted arguments as to why the electrical man is the logical outlet for electrical goods. The fact remains that these other people are getting a good part of the business. They have been in business for a long time and are naturally the possessors of valuable merchandising experience. Their methods are efficient because their business is handled without guesswork. The electrical business is comparatively new and lacks what might be called trade traditions; i.e., established ideas and customs of doing business. In the natural course of events, these are a slow and steady growth—a man has run his business more or less efficiently, but his son takes it over, with a better experience, and so on. That leisurely development, however, cannot be tolerated in the electrical business in view of the sudden demand and wide market; in view, also, of the ready-made competition that is shooting holes in the legitimate profits of the electrical dealer.

The man who, in the past, has not been keeping accurate cost records has got to change his ways. A system of electrical merchandising must be—and is being—built up that will sweep outsiders off the map, and the man who would be successful must adopt this system.

As a practical illustration: "Service" is a good motto, but it is a mistake to spread service around too lavishly, with no idea of what it costs. How many merchandisers know what it cost them last year for all the little service calls they answered? Those jobs were little enough, but they cost money and the total would surprise the man who has not kept track of them. No right-minded merchandiser is going to shut down on service calls but he is going to know what they cost him, and arrange to cut down that item of overhead to a legitimate figure.

Then there's the question of rating, again. It is essential that the executive head of a business have, at all times, complete control and knowledge of the details of the business, and this requires a proper accounting system. The man that can present a statement that shows his banker or jobber that he understands his business thoroughly is doing a great deal to maintain his credit.

Apportioning Items of Cost

Granted that a man has an accurate knowledge of his total costs, there is another pitfall ahead, in that the various items may be improperly proportioned. Judgment and experience are the best guides in this matter. It is for this reason that during the past few weeks we have taken what may be called a census, in an endeavor to determine what the experience of Canadian merchandisers has been in this regard. A questionnaire was submitted to a large number of merchandisers, and two tables are given below which outline and clarify the result of this investigation.

Table I is a list of average costs, based upon the total number of replies received. It would doubtless be too much to say that if the various items of a business were either higher or lower than this average, there was something wrong, but, at least, this table provides a useful basis for investigation and comparison.

Table II represents the cost-of-doing-business figures of seven representative retailers. It will be noted that in some cases the items are not divided exactly alike. The general basis, however, is the same, a year's sales and a year's expenses.

These figures apply to conditions as they are today. There is no doubt that this overhead should decrease with an increase in volume of sales.

Table I

Average Overhead of Electrical Retail Merchandising in Canada

Wages of salesforce	7.35
Premiums	.86
Advertising	2.33
Wrapping and other selling	.91
Total selling	11.45
Delivery	1.93
Buying, management and office salaries	4.59
Office supplies, postage and other management	1.37
Total buying and management	5.96
Rent	3.62
Heat, light and power	1.06
Taxes (except on buildings, income and profits)	.64
Insurance (except on buildings)	.49
Repairs of store equipment	.34
Depreciation of store equipment	.902
Total interest	2.95
Total fixed charges and upkeep	10.00
Miscellaneous	1.504
Losses from bad debts	.71
Total expense	31.55

Summary

The collection of this data brought out three striking facts, as follows:—

(1) A large number of dealers were not able to produce their cost-of-doing-business figures. They acknowledged that they should have had them and gladly admitted that they were anxious to see the costs of other men in the same line of business, but it was frankly beyond them to classify their own expenses.

(2) There is a wide discrepancy in the various items. Why should one man pay 14 per cent of his total revenue to

Table II

Overhead Expenses of 7 Representative Canadian Electrical Merchandisers

Item	A*	B	C	D	E	F	G	H
	Per Cent of Net Sales							
Wages of salesforce	3.00	13.9	9.30	5.3	3.55	10.5	2.97	5.92
Premiums		.6	.10			.9	1.58	1.11
Advertising	4.50	1.1	2.20	.03	2.22	4.7	3.68	2.39
Wrappings and other selling	3.59		.22	.9		2.3	.07	1.02
Total selling	11.09		11.82	6.23		18.4	8.30	10.44
Delivery		7.0	1.10	.92	.4	2.5	1.06	.52
Buying, management and office salaries	8.25	0.5	5.08	4.23	6.17	12.0	1.67	2.48
Office supplies, postage and other management		0.8	0.72	1.18		3.0	.33	2.19
Total buying and management	8.25	1.3	5.80	5.41		15.0	3.06	4.67
Rent	6.50	4.3	1.15	2.07	5.22	10.0	1.17	1.43
Heat, light and power		0.1	.42	.22	.88	3.3		1.42
Taxes (except on buildings, income and profits)			.89	.11		1.5	.07	
Insurance (except on buildings)	.07		.52	.77	.3	.7		.15
Repairs of store equipment			.20			.6	.23	
Depreciation of store equipment			.47	.08	.53	1.4	2.90	.033
Total interest	4.50		3.00		2.13	2.3	4.37	
Total fixed charges and upkeep			6.65	3.25		19.8		3.05
Miscellaneous			3.00	.43	2.33		.79	.97
Losses from bad debts		1.9	.30	1.0	.35	.6		.13
Total expense	41.00	30.2	28.67	17.24	24.12	41.3	16.52	19.79

*Figured on cost price.

his salesmen and another only 3 per cent? Is one dealer justified in paying 10 per cent for rent, when another "gets by" with an outlay of only 1.3 per cent? Can delivery expenses legitimately vary from .4 to 7 per cent? Buying, management and office salaries are difficult to regulate, but can they be shoved down from 12 per cent to .5 per cent without loss of efficiency? It should be possible for any retailer to answer these questions satisfactorily.

(3) The third point brought out is the extreme variation in the cost-of-doing-business totals—41.3 per cent down to 16.12 per cent. Undoubtedly there are inflexible circumstances, such as location, available capital, etc. that influence this total cost, but, is the extreme fluctuation indicated by this table consistent with good business?

The figures were obtained on the understanding that the names of the various dealers would not be published. It is, however, of interest to note that examples A and B in Table II are from the appliance departments of two large central stations, one in Western Canada and one in Eastern Canada; C, D, E and F are contractor-dealers, two in the West and two in the East; G and H are from two Hydro municipalities, among the largest in Ontario.

"Lest We Forget"

Do you remember the tremendous heat wave of 1921—how you were besieged by the public for fans—how you tried frantically to buy them from every jobber on your list—how you telephoned and wired to no purpose?

Don't be caught again this year. July and August almost invariably throw a heat fit, just as they did last summer. Think of the profits you lost by not being ready and lay in a fair stock while the weather is yet comfortable.

Use the same arguments with your customers to get them to purchase in advance. Remind them of the sleepless nights they spent, the days of discomfort and prostration. Remind your business customers of the loss of efficiency in their employees.

Learn experience from the straw hat dealer —you never catch him without summer headgear on the twenty-fourth of May—hot or cold.

What Does a Woman Mean When She Says "No"?

"No," said the housewife—and it was with more or less difficulty that Bill managed to smile as he turned and walked off the porch. It was the twentieth time that day that he had been greeted—and dismissed too—with that word when he had mentioned the article he was trying to sell.

Bill was an inexperienced salesman—just out of school in fact—and he was trying hard to make a good beginning, so he made another attempt.

"No," said the twenty-first housewife.

"By golly," said Bill to himself after he got back to the sidewalk, "there's something radically wrong. Some of those women might have meant 'no' when they said it, but I don't believe all of them did. I'm not going to take 'no' for an answer after this!"

That was quite a while ago, when Bill first started out to sell. Today he is one of the best salesmen in his division, and if you will trace back you will find that his success started that day when he decided that he wouldn't take 'no' for an answer.

"I discovered," said Bill the other day, "that it is easier for a woman to say 'no' to a salesman that it is to say anything else. And I also discovered that 'no' has more shades of meaning and stands for more boiled-down excuses than there are letters in 'transubstantiation.' In other words, when a woman says 'no,' the chances are she doesn't always mean it. She may think she means it all right, but as matter of fact what she really means in a great many cases is any one of the following:

"'I don't understand.'

"'I'm afraid I can't afford it.'

"'I might buy later.'

"'I'm not feeling in the mood today.'

"'My husband would object.'

"'I'm going out and haven't time now.'

"When I start out to sell a prospect now I take into consideration the fact that she may be saying 'no' just as a matter of habit or as the easiest way of disposing of me. And straightway I say to myself, 'Madam, I don't believe you.' In other words I don't take 'no' for an answer.

"I always give my prospects who say 'no' another chance, so to speak, drawing them out to find what real shade of meaning is lurking in their minds. And very often I come away with the order!"

The "no" proposition is about the same whatever you may be selling to prospects in their homes,—especially when you happen to be out prospecting or making a cold canvass. If you take "no" for an answer your chances of making a great number of sales is mighty slim. If you analyze and draw out the picture behind the "no," your chances climb like stock in a "bull" market.

As has been pointed out somewhere or other, there's many a married man who would be a bachelor today if he had taken the first "no" his wife gave him as final!

—Hoovergrams

> **There is a lot of radio "junk" on the market that should only be found in Woolworth's 5, 10 and 15 cent stores. Don't get any of this on your shelves or hand it to your customers. It may mean a little immediate profit, but will react against you and your business in the very near future. The best radio equipment is none too good.**

The Ferguson Manufacturing Co.

The Ferguson Manufacturing Co., 174 King St., London, Ont., are now manufacturing conduit pipe fittings. These are made of close grained cast iron, carefully selected to ensure smooth castings and properly threaded holes, well japanned on the inside and electro-galvanized on the outside. The cover openings are ground flat and the screw holes well centred. The Hydro-electric Power Commission has approved these fittings, which are attractive both in appearance and price, and which can be shipped promptly from stock.

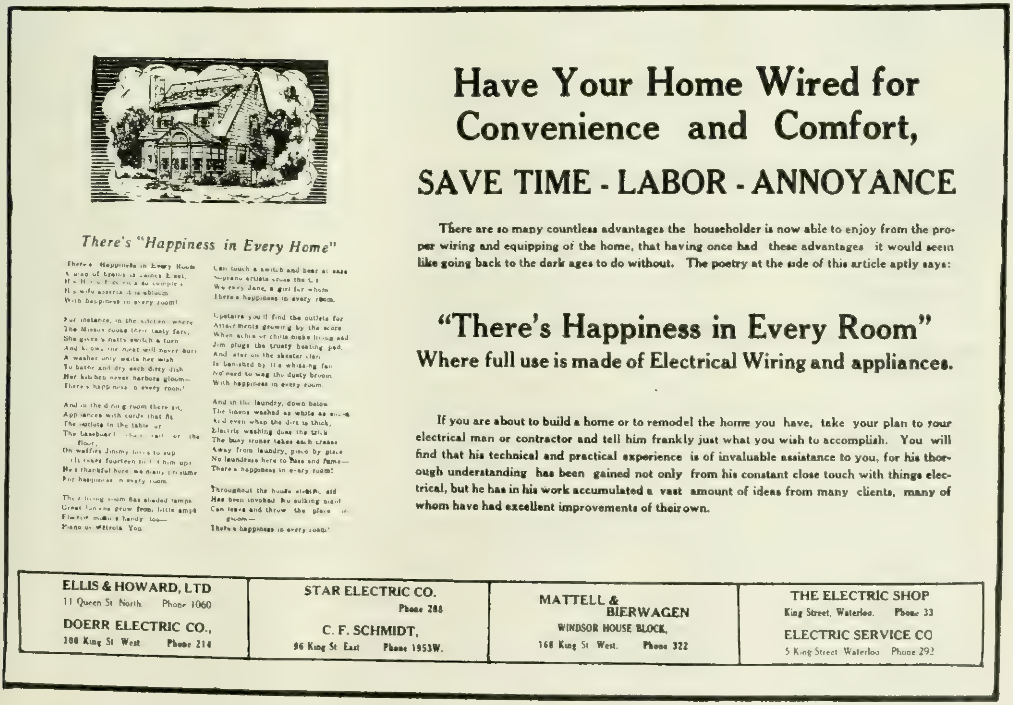
Selling Chiefly to Contractor-Dealers

The Canadian Fairbanks Morse Co. Ltd., are dealing extensively in radio equipment and report business as being very good. Their chief trouble is getting shipments. They claim that the bulk of their radio equipment sales have been to the electrical dealers.

It Cleans, Waxes, Polishes

In a recent issue we described the new floor waxer and polisher that had just been placed on the market by Messrs. Skelton & Connor, the principals of the Canadian Floor Waxer & Polisher Co., Ltd. In the interval this company has been working hard to reach a point where the manufactured supply would be equal to the demand, and believe they are now in a position to turn out machines as rapidly as the dealers can handle them. With the added operating experience they have also been able to eliminate any little minor troubles that developed and believe they have now a well nigh perfect product.

The company has just made another very interesting announcement which will also give a great deal of satisfaction to the dealers, namely, that the retail price has been reduced from $65. to $52.50. As explained by the company, the original price was figured on a basis that would to some extent take care of organization and experimental charges. As production has increased, however, and the demand of the public has been demonstrated, they have decided it would be best to immediately cut the price to the consumer to the lowest point so as to assist the dealer in every possible way. The company states that dealers report splendid satisfaction on the part of their customers.



There's "Happiness in Every Home"

There's Happiness in Every Room
A man of brains is James Keel,
His house electrical so complete
His wife asserts it is abloom
With happiness in every room!

For instance, in the kitchen where
The Missus cooks their tasty fare,
She gives a natty switch a turn
And knows the meat will never burn
A washer only waits her wish
To bathe and dry each dirty dish
Her kitchen never harbors gloom—
There's happiness in every room!

And in the dining room there sit,
Appliances with cords that fit
The outlets in the table or
The baseboard [illegible] rail or the floor,
On waffles Jimmy loves to sup
(It takes fourteen to fill him up)
He's thankful here we may presume
For happiness in every room

The living room has shaded lamps
Great lumens grow from little amps
Electric music's handy too—
Piano or Victrola. You
Can touch a switch and hear at ease
Soprano artists cross the C's
We envy Jane, a girl for whom
There's happiness in every room.

Upstairs you'll find the outlets for
Attachments growing by the score
When aches or chills make living sad
Jim plugs the trusty heating pad.
And later on the skeeter clan
Is banished by the whizzing fan
No need to wag the dusty broom
With happiness in every room.

And in the laundry, down below
The linens washed as white as snow
And even when the dirt is thick,
Electric washing does the trick
The busy ironer takes each crease
Away from laundry, piece by piece
No laundress here to fuss and fume—
There's happiness in every room!

Throughout the house electric aid
Has been invoked. No sulking maid
Can leave and throw the place in gloom—
There's happiness in every room!

Have Your Home Wired for Convenience and Comfort,

SAVE TIME - LABOR - ANNOYANCE

There are so many countless advantages the householder is now able to enjoy from the proper wiring and equipping of the home, that having once had these advantages it would seem like going back to the dark ages to do without. The poetry at the side of this article aptly says:

"There's Happiness in Every Room"

Where full use is made of Electrical Wiring and appliances.

If you are about to build a home or to remodel the home you have, take your plan to your electrical man or contractor and tell him frankly just what you wish to accomplish. You will find that his technical and practical experience is of invaluable assistance to you, for his thorough understanding has been gained not only from his constant close touch with things electrical, but he has in his work accumulated a vast amount of ideas from many clients, many of whom have had excellent improvements of their own.

ELLIS & HOWARD, LTD 11 Queen St North Phone 1060 **DOERR ELECTRIC CO.,** 100 King St West Phone 214	**STAR ELECTRIC CO.** Phone 288 **C. F. SCHMIDT,** 96 King St East Phone 1953W.	**MATTELL & BIERWAGEN** WINDSOR HOUSE BLOCK, 168 King St West. Phone 322	**THE ELECTRIC SHOP** King Street, Waterloo. Phone 33 **ELECTRIC SERVICE CO** 5 King Street Waterloo Phone 292

Co-operative advertising as it is done in Kitchener and Waterloo

Actual Figures on Electric Supply to Rural Customers

Some Interesting Data Compiled out of the Experience of the Ontario Hydro Commission

The latest issue of the Hydro-electric Power Commission "Bulletin" contains some very interesting figures on the cost of the installation and operation of electrical equipment in a number of typical farm homes. The information is summed up in two tables, which are reproduced herewith. The data included refers to farms in Brock township, Ontario County, Ontario, and are given for the purpose of illustrating, comparatively, what can be accomplished in any rural community installation costs are surprisingly reasonable.

Table Showing Comparative Data on Rural Electric Service

Farm No.	I	II	III	IV	V	VI	VII	VIII	IX
Rates									
Annual Service	$60	$60	$36	$36	$60	$60	$60	$60	$36
1st Meter Rate	7c.	7c.	7c.	7c.	7c.	7c.	7c.	7c.	7c.
Annual K.W.H.					¼ yr.				
In lighting	130	946	295	387	88	1138	434	604	278
In power	284	1219	702	347	119	681	398	514	278
Work Done									
Bu. chopping	1000	5000	3000	1500	175	4000	3000	2400	1500
Root pulping	1200	35 Hrs.	—	3000	700	3000	500	3000	4500
Hrs. Milking	90	150	—	—	—	—	—	—	—
Separating	yes	yes	yes	—	—	—	—	—	—
Pumping	yes	yes	—	yes	—	yes	—	175 hrs.	400 hrs.
Feed Cutt'g	—	yes	yes	—	15 hrs.	60 hrs.	30 hrs.	20 hrs.	—
Total Cost	$85.12	$196.10	$95.15	$79.45	$26.48	$151.07	$110.57	$126.49	$73.78

Table Showing Comparative Data on Installation for Rural Electric Service

Farm No.	I	II	III	IV	V	VI	VII	VIII	IX
House Wiring									
No. of Outlets	18	23	21	29	12	41	26	28	20
Cost of Wiring	$100.00	$190.00	$100.00	$115.00	$100.00	$130.00	$ 75 00	$100.00	$ 75.00
Cost of Fixtures	$ 10.00	$ 75.00	$ 80.00	$ 18.00	—	—	—	—	—
Barn Wiring									
No. of Outlets	17	22	16	17	13	20	16	15	11
Motor	1	1	1	1	1	1	1	1	1
Cost of Wiring	$151.50	$150.00	$170.00	$158.73	$138.00	$200 00	$175 00	$166.00	$145 00
Motor Installation									
Sizes in H.P.	5	8	5	5	5	5½	5	5	5½
Cost	$148.50	$378.00	$165.00	$149.50	$176.00	$220.00	$165 00	$155.00	$235.00
Line to Road									
Length in Rods	18	20	255	36	60	24	60	49	24
Poles included	—	—	-	—	—	—	2	—	-
Cost of line	$ 30 00	$ 50.00	$119.34	$ 63.45	$265.00	$ 49.56	$100 07	$ 53.87	$ 54.34
Total Cost	$440.00	$843.00	$634.34	$504.76	$679 00	$599.56	$515 07	$474.87	$509.34

Electric Co-operative Leagues Performing Valuable Services for the Industry

The scope and possibility of accomplishment of Electrical Co-operative Leagues in the various Provinces of the Dominion is exceeding the expectations of even those who most favourably look upon and most ardently support this movement; in fact, if properly conducted and supported, these Leagues will perform an economic function in the changed conditions that will not only help to unify the scattered efforts, in the same direction, of the various groups within the industry and educate the public in the value of electricity as one of the most important factors in improving social conditions of communities, but will prove to be a saving of considerable value in marketing electrical merchandise.

Such movements as the recent efforts of business development of the N.E.L.A., the education campaigns of Trade Papers in their editorial and special articles, to be made effective, must have local agencies; it is through the Electrical Co-operative Associations that this work can be carried on most effectively.

The Electrical Co-operative Association, Province of Quebec, which began its work some eighteen months ago, though working with a very limited budget as yet, has proven the usefulness of such an organization; this, despite the great handicap of bilingualism prevailing in that province, which makes the work so much more costly and tedious. Its secretary-manager, referring to the Association's third semi-annual report to the executive, under the sub-title of "The Boy is Growing," says:

"Born eighteen months ago under the leadership of some of the most prominent men in the industry, our Association has no apologies to offer for the progress in its growth. We've cut, in that time, all our teeth and are trying to crack some tough nuts; we are off the baby's chair and are kicking around like a spring colt on a meadow; in another six months we shall be ready for a larger allowance of oats to pull the load along.

"During the first half of the year 1921-1922 there were held ten meetings of the Executive. The Trade Relations Committee met every Tuesday since its first meeting on November 29th, making a total of twenty-one meetings at which matters mainly pertaining to the relations of contractor-dealers and jobbers, and infractions of the adopted Code of Business Ethics, were discussed. Sale of foreign made goods on the Montreal market, competition of fixture manufacturers with the dealers in selling to the users, the Modern Electrical Home and Entertainments had also the attention of this committee. Members have attended the meetings very well, except for the past two or three weeks, which is accounted for by the moving season somewhat increasing business activities and efforts to get business. There is no doubt that this committee has performed, and will perform, very valuable services toward popularizing the work of the Association.

"The Single Service Entrance Committee, consisting of representatives of power companies, Fire Underwriters and Government Inspection Bureaus, Builders' Exchange and the architects, the two latter bodies in consulting capacity, after several meetings have adopted rules governing the single service entrance in all the new, remodelled and other buildings, where practicable. The Underwriters' Bureau has decided to have printed instructions covering it in detail, and to enforce it from June 1, 1922.

Organization

A great deal of time and effort was spent on organizing the English Section of the contractor dealers, which included 14 general meetings, 3 joint executive meetings of the French and English Sections, and 3 joint contractor dealers and jobbers meetings; during the time reported, 642 letters, not including usual meeting notices, were mailed. There is no doubt that improvement in the Contractor-Dealers' Association and acceleration of the activities of the new chartered Association is due to the assistance and work done on their behalf by the Co-operative Association.

Window Dressing

A campaign for better window dressing was begun last Christmas and, by means of the bulletins, it is being continually brought to the attention of the dealers. No very positive results have been accomplished as yet, though some requests were received and a certain slight improvement is noticeable. It will require special effort.

Government Licensing

The persistent requests of the Association by letters, telephone and personally directed appeals to the Deputy Minister of Labor to enforce the May, 1921, Act of licensing electrical contractors and journeymen and of inspection of electrical work, had considerable bearing on the Department of Labor taking final steps towards the enforcing of the Act. The preliminary work in connection therewith having already begun, the licenses are being already issued to those contractor-dealers who can pass the necessary examination.

Co-operative Luncheons

The Association supplied speakers for the second Wednesday luncheons in January, February, March and April. The speakers supplied not only gave interesting addresses on various phases of co-operation, but also enabled the Association to be brought into closer contact with organizations whose goodwill and support will prove to be of great value in future work of the Association. Bulletins reporting activities of the Association are sent periodically to all the members and others connected with the electrical contracting business in the province.

Electrical Homes

Electrical Home No. 1, with all its defects and drawbacks, was visited by 10,555 persons, at a cost of approximately .03¾ cents per visitor. A large number of "Improve on Yesterday" pamphlets were given away and a satisfactory number of requests for "Wiring the Home for Convenience and Comfort" were received and are still coming in.

We had to postpone the opening of Home No. 2 from April to September, due to the moving season, which did not permit of getting the necessary number of hosts to attend to the visitors.

The next "Home", in the Notre Dame de Grace district, will be a great improvement on the previous one, from every point of view.

The Lancashire Land & Construction Company is building a special house for that purpose, and all the committees are organized to make it a success. Besides special features of the building itself, the first electrified full suite dining and bedroom furniture manufactured in Canada will be displayed.

Gibbard & Company, manufacturers of solid walnut and mahogany furniture, in Napanee, Ont., are co-operating with our Association in this respect. There will be scientific illumination and artistic fixtures provided throughout the house, and a radio outfit installed.

Distribution of Literature and Emblems

A number of pamphlets "Improve on Yesterday" were distributed directly among the public, giving suitable explanations as to how the home can be improved by application of electricity; all members of Quebec Legislature had sent to them copies of "Comfort and Conveniences of electricity in your Home"; some 350 copies of "Wiring the Home for Convenience and Comfort" were distributed among the contractor-dealers and the prospective builders in Montreal and the Province and 200 were sent to the architects in the Province of Quebec.

Some 300 emblems of the Association were sent to the members and can be seen in offices, stores and display windows; it eventually will have significance as the public is beginning to be familiar with it.

600 copies of Braley's "Origin of Co-operation" were distributed among those connected with the electrical industry in the Province.

Socials

A smoking concert attended by over 400 men was held during the past winter and a dance in the Venetian Gardens after the Electrical Home was closed.

It served to bring together the electrical fraternity and to give considerable publicity to the Association among many who otherwise do not come in direct contact with the Association's work.

Besides, there is a desire among a considerable portion of the electrical men to get together occasionally for social purposes.

Model Wiring Plan

A Wiring Committee, consisting of Geo. K. McDougall, electrical consulting engineer, and a specialist on illumination; Frank Penden, architect; E. J. Gunn and Wm. Rochon, electrical contractors and Fred. J. Parsons, fixture dealer are working out a model wiring plan for an average sized and priced dwelling according to modern requirements for electricity in a home. It will be available to all the contractor-dealers and builders of houses as a suggestion for "properly wired homes." The Lancashire Land and Construction Company is adopting that plan for wiring a number of houses built by them this season; we do not doubt that other builders will gradually follow. The same committee is preparing a set of standard electrical symbols for use in architects' and builders' plans.

Man Who Does not Know His Costs is a Menace

No one believes more firmly than we, nor has anyone lived more faithfully up to that belief, that prices must come down as closely to the pre-war basis as possible and that to do so the manufacturer must use much inventive talent and the factory must be standardized as far as possible and production problems solved.

We also believe that what is commonly known as the market price should be set by those who can produce the best article at the lowest figure, not by those who keep on in the same old way with no ability or attempt to meet their problems by a change in their program.

If all concerns would insist on getting a fair profit, quite as many goods would be sold and business would the more quickly return to an even keel.

The chief trouble with a broken market on any given line is the danger of a price which benefits no one for long but injures many forever. In such a warfare purchasing agents become most perspicacious—almost uncanny—even going so far as to place almost unheard of discounts on an order as a tryout after the real bottom if there be any. They tell the salesman any sort of tale as to the price of the other firm and confusion becomes worse confounded.

People shop around—they turn down their best and oldest friends for three cents and even go so far as to think the old friend is not on to his job, but that the new low pricer is the Daniel come to judgment.

A great contributing cause to such a situation is the distrust that gets fixed in the head of the purchaser when high prices run a riot of debauch as in 1919-1920.

Just the same there is the other dangerous extreme witnessed today in some of the wiring-device lines—where selling below cost is the habit of the hour. Of course other less competitive lines have to bear the loss. If there be no such lines to stand such losses—the answer is go-broke-sir.

It also is rather pathetic to note on occasion the opposite policies followed by the selling and buying end in the same concern. The selling department may be fighting a noble fight against a price break-down, struggling to win a profit against hard odds, and gaining headway through service and selling brains, while all the time the buyer is endeavoring to squeeze the last ounce of profit out of the man who sells him.

Such a procedure lowers the vitality of business. It breeds suspicion, it injures electrical standards, it hurts morale, breeds tricksters and in the final analysis it does very little to stimulate business.

None of us are perfect in any particular and in times like those we have gone, and still are going, through, pesky people are bound to arise and foolish deeds be done, but if such a demoralizing condition extends too far and soaks too deep it acts as a very real barrier to the return of the better day.—Trumbull Tem

W. Ross Hilton Joins S. W. Farber

Mr. Ross Hilton, of Montreal, Quebec, has recently become associated with S. W. Farber of 141 5th Street Brooklyn, New York, inventors of the famous "Adjusto-Lite," as factory representative in the Eastern Provinces of Canada. Mr. Hilton comes very highly recommended as he has a very wide knowledge of Canadian territory and Canadian business methods. He has travelled the Dominion for a good many years for such concerns as the Northern Electric Company, Ltd., Crown Electric Company, Ltd., and McDonald & Willson, Ltd. It is the intention of F. W. Farber to carry out a very extensive advertising and sales campaign on the "Adjusto-Lite" throughout the Dominion of Canada. Mr. Hilton will also represent Mr. Farber on the various lines which they manufacture, such as brass and copper ware, silver holloware, smoking articles, electric portable lamps, and stationary desk sets. In selecting Mr. Hilton as their factory representative, Mr. Farber states he had in mind the desire of having a man represent them who would prove an asset to the Canadian merchants, from his knowledge and experience, and afford them a valuable marketing and merchandising counsellor.

W Ross Hilton

Cyclone Paralyzes Winnipeg Service

Records Established in Building Transmission Lines Under Most Adverse Conditions—The Value of a Standby Plant

A serious interruption in electric service occurred in the City of Winnipeg on May 10th when a break in the transmission lines of both light and power utilities occurred. A cyclone of unparalleled force struck the country about 50 miles north-east of Winnipeg, levelling the trees, demolishing farm houses and wrecking 15 towers on both the old and new transmission lines of the Winnipeg Hydro and 11 towers on the transmission line of the Winnipeg Electric Railway. The first indication that a disaster had occurred was when all power on the company's lines was interrupted at about 12:30 p.m. tying up street car traffic and all services fed from the W.E.R. went dead. 20 minutes later all services supplied from the municipal plant were in turn affected, completely tying up all industries. At 2:05 p.m. service was partially restored on the street cars by the operation of the steam auxiliary plant of the railway company, but it was not until 24 hours later that all services were once again in operation in the city.

A great amount of damage was done to the Winnipeg Hydro lines in a very inaccessible part of the system, north of Milner. This was on the high ground known as Milner Ridge which is in a very exposed situation. The break occurred 6½ miles in from the Lac du Bonnet branch line in a country consisting mostly of muskeg. To make matters worse there had been a continuous down pour of rain for 3½ days previously, resulting in the country being practically impassable to traffic. A valiant attempt was made by the repair gang to get to the scene of operations quickly but owing to the impassable condition of the roads it was after 9 o'clock before men and material arrived at the site of operations where they already found the power house superintendent with two of his section crews on the job. The 6½ miles from the railway was traversed by men with material packed on their backs wading up to their knees in water.

The freakish nature of the cyclone was evident by the fact that towers on the west section of the track and also the trees in that vicinity were blown over to the south while on the east side of the track trees and towers were blown to the north; also the cable was blown for over 100 feet on either side of the right of way. A homesteader's log house within 200 yards of the line was completely demolished and the roof carried ½ mile away. Many other farm buildings in the surrounding country were practically wiped out, the homesteaders being left without buildings of any description. The collie dog shown in the accompanying photograph had his first experience of flying as both dog and kennel disappeared entirely, the dog returning 2 days later.

Steel tower leveled by Manitoba cyclone

The work of organizing the camps supplying food was made exceedingly difficult by the continued down-pour of rain, but repair work was carried on throughout the night. It was decided to get one circuit into operation as soon as possible. While the linemen were engaged in disentangling cables the section gang dug holes and carried in light poles. A reinforcement of men arrived about 4:30 a.m. on the morning of May 11th on a special train from Winnipeg. Many of the linemen walked 21 miles to get to the scene of operations after being carried as far as Tyndall in motor trucks where it was impossible for them to proceed any further on account of the bad condition of the roads.

Temporary transmission line structure following cyclone at Milner, Man.

The work of erecting a temporary wooden structure over one mile in extent was practically completed by 5:20. The greatest difficulty was incurred in disentangling the cables and resplicing them where they had been cut or broken.

After lines No. 1 and No. 2 were in operation the work of diverting No. 3 and No. 4 circuits to the north of the right of way was commenced. This was necessary as these circuits were required to be put in operation before permanent repairs could be gone ahead with. The members of the staff and emergency gang went to work in a cheerful spirit and with unstinted efforts through the most trying conditions in order to give the citizens of Winnipeg service as soon as possible. Everyone was wet through, in some places it being necessary to work in water up to the waist. This, however, did not check their enthusiasm and they worked with a willingness that has earned them great praise.

The estimated cost of repairs will be approximately $15,000 for permanent repairs while it will take at least $5,000 to take care of the cost of building the temporary structure. A shut down of long duration is an unusual experience for the City of Winnipeg but it has brought to the surface the question of building a standby plant as it is felt that industrial concerns particularly cannot afford to have their stock endangered by a tie-up of this description. The City Council are alive to the situation and have asked manager Glassco to report on the cost of building a standby plant. This will in all probability be of 33,000 h.p. capacity, consisting of 2-12,500 kv.a. steam turbo-generators with oil fired boilers. The cost of a plant of this kind would probably amount to $1,500,000.

Manitoba Power Co. to Deliver Power this Year

The visit of a number of prominent business men and engineers of Winnipeg to the plant of the Manitoba Power Company on May 17 was signalized by the announcement of the engineers on the ground that the first unit would be completed and delivering power to Winnipeg by Christmas this year.

The party numbering 150 men left Winnipeg by a special train, the guests of Sir Augustus Nanton, and inspected the work done which consists of the erection of an immense cofferdam on one side of the island which here splits the river. Where the diversion of the current has laid bare the bed of the river, tremendous excavation work has been done, and concrete is being poured in for the foundations of the power house. Work has been commenced on a dam across the island and from its further side to the opposite bank which will raise the level of the water 46 feet, while at White Mud Falls, two or three miles down the river, work is in progress by which the water level will be lowered 10 feet, thus giving a head of 56 feet for generating power.

After dinner, the members of the party visited every part of the work under the direction of capable guides. F. H. Martin, engineer in charge, explained the system by which expense of construction has been reduced to a minimum. Practically the entire engineering personnel was on the ground to explain the project in all its details.

Confidence in Winnipeg

In the after dinner speeches a strong feeling of confidence in Winnipeg and its ability to absorb the whole of the power available as quickly as the development takes place was predominant. Sir Augustus Nanton traced the history of the Winnipeg Electric Railway Company, and in referring to the pioneers mentioned, Sir William Van Horne, Sir William Whyte, Sir William Mackenzie, Sir Donald Mann, D. B. Hanna and J. H. Munson. He spoke well of the work of the late manager, Wilford Phillips, and praised in glowing terms the work of A. W. McLimont, the vice-president.

Mr. McLimont drew an optimistic picture to show how the power development would insure the industrial development of the city, and emphasized the need of co-operation. In closing, he paid a tribute to Mr. Julian C. Smith, supervising engineer, and the Fraser Brace Company.

Julian Smith's Assurance

Julian C. Smith, vice-president of the Shawinigan Water and Power Company, said that it was most remarkable that the only adverse comment he had heard of the Manitoba Power Company was in Winnipeg. "Surely," he said, "Winnipeggers do not intend to stand back and let people from Montreal and New York make this city assume the importance it rightly should?" He thought that Winnipeg was in need of confidence in their own future by the citizens, themselves. Outsiders had that confidence in Winnipeg.

Major James H. Brace, also appealed for a demonstration by Winnipeg people of their confidence in the city. He thought they should show their appreciation of the efforts of those responsible for starting this great power project by assisting and co-operating; if they did not they were not worthy of having the city progress at all.

D. H. Cooper, manager of the National Trust Company, thanked Sir Augustus Nanton for providing the opportunity for visiting the plant, which he regarded as a tremendous factor in the future development of Winnipeg as a manufacturing centre.

Travers Sweatman, president of the Board of Trade, said Mr. McLimont's message of co-operation should be strongly emphasized. The fact that outsiders had been persuaded to invest $7,500,000 in the project spoke for the confidence they had in the future of the city, he declared.

Ahead of Last Year

Alex MacKenzie, general sales manager of the Canadian National Carbon and Prest-O-Lite Co's., was a recent visitor to Winnipeg, spending a week with R. F. Kingsbury, manager of their Western division. Mr. MacKenzie stated that their business in this division is ahead of last year and anticipates good business for the balance of 1922.

Appointed Representatives

The Russell-Fowler Co., have removed from 306 Notre Dame Ave., to 104 Capitol Theatre Building, Winnipeg. This firm have just been appointed western representatives for the Pittsburg Reflector and Illumination Co., Pittsburg, Pa., and Smith and Stone Ltd, Georgetown, Ont.

Attended Annual Conference

W. H. Reynolds, western manager of the Eugene F. Phillips Electrical Works Ltd., has just returned to Winnipeg from a two weeks' trip to Montreal and Toronto, having attended the annual conference of the firm at Montreal. Mr. Renyolds states that present prospects point to more activity in the West. While he does not predict a boom, he is looking forward to increased sales from now onwards, and feels that the depression of trade that has existed, is a thing of the past.

Contract for Oddfellows Home

Gamble and Willis Co. Ltd, 306 Notre Dame Ave., Winnipeg, have been awarded the electrical contract for the Oddfellows Home, at St. Charles, Manitoba; the total contract price of the building is in the neighbourhood of $100,000.

Business Better than Anticipated

W. W. Robinson, Western representative of the Jefferson Glass Co., and the Crown Electrcal Mfg. Co., has just returned to Winnipeg after a two months' trip through Western Canada as far as the Pacific Coast, and reports business far better than he anticipated. The dealers appear to be very optimistic and a number of them are buying novelty lines, such as bronze table lamps, etc., in preference to staple lines. Mr. Robinson says, that the dealers are carrying very low stocks, and if the West has a good crop this year, there is sure to be heavy buying this Fall.

Messrs. Ferranti Limited, of Hollinwood, Lancashire, have lately been entrusted by the Publc Works' Department, of the New Zealand Government, with a contract for the supply of seven 4,000 kv.a., 110,000 volt, single-phase, oil-immersed force-cooled transformers, in connection with the Mangahao Hydro-electric Power Scheme."

The Flow of Fluids Measured Electrically

The measurement of fluid flowing in a pipe presents a difficult problem; in the case of steam, this problem is extremely important to the electrical man. This is particularly the case in industry where, though the plant may be using hydro electric power, steam is used for many purposes and the boiler plant is under the supervision of the power plant superintendent. There has been perfected a device for the purpose of measuring the flow of steam or other fluid, that measures the flow directly by means of ordinary electrical instruments, and that seems to be very little known.

This measurement is accomplished by means of an electric current, which is regulated by the differential pressure of the flow. The current measured electrically represents directly the amount of fluid passing through the pipe to which the instrument is attached.

The principles involved are demonstrated diagrammatically in the figure. The instrument is designed on the U-tube principle, partly filled with mercury and balances the impact pressure of the flow in the pipe by the rise of mercury in the low-pressure side of the tube. The mercury column also forms a part of the electric circuit, as shown in the figure. This electric circuit contains a fixed external resistance R_2, a constant electromotive force E, an ammeter A and a watt-hour meter W. In the contact chamber C, which forms the low-presure side of the U-tube, there are a number of conductors of varying lengths placed above the mercury column, and as the mercury rises it makes contact with one conductor after another. The variable resistance R_2 is subdivided by these conductors into resistance steps corresponding to the varying lengths of the conductors, so that the rise and fall of the mercury column varies the amount of resistance and thereby regulates the amount of current passing through the circuit,

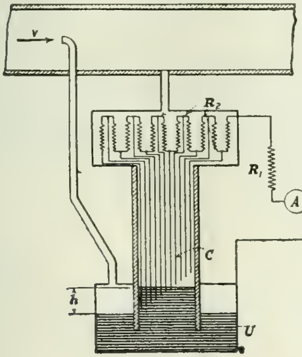


Fig. 1.

The basic principle accordingly involves the laws governing the flow of fluids through pipes along with those governing the flow of an electric current. The problem of establishing the theoretical relation between these fundamental laws offered little difficulty because of the similarity between the units of flow measurement, such as pressure and velocity, and the units of electric measurement, such as voltage and current.

As may be surmised the practical instrument is of vastly different appearance, and in some cases includes the use of an integrating feature which is of importance, since the readings from the watt-hour meter are more accurate than those taken from a recording ammeter. This feature therefore eliminates the necessity of planimetering charts and insures accurate results for any variation of flow.

When measuring the flow of steam generated by a battery of boilers the flow indicators are placed in front of each boiler, showing the momentary performance for the guidance of the fireman. At the same time, supplementary recorders connected electrically with the indicators are placed conveniently for the supervision of the chief operator.

Recently the manufacturers of water gas adopted the use of low-pressure exhaust steam for gas generation, which created an urgent demand for a measuring device to operate intermittently, varying every few minutes from zero to maximum. The electrical method of flow measurement was adopted, as this made it possible to measure successfully the steam required for the manufacture of water gas.

The main advantage of the electrical method of flow measurement is the accuracy with which the differential pressure is transmitted through a mercury column, which is free to attain the true level under all conditions of flow. Furthermore, the electrical instruments used to register the flow can be checked at any time without interfering with the operation or installation of the measuring device.

Hydro and Dealers Working Together

The difference that has existed for some months between the Winnipeg Hydro and the Winnipeg contractor-dealers has now been overcome. Among the various objections raised by the dealers was, that the Hydro used the term, "Can be obtained from your Own Hydro" in their advertising copy. This has now been changed to "Can be obtained from Electrical Dealers or Your Hydro," and sometimes to "Visit the Electrical Dealers or Your Hydro," omitting the word "Own." Another matter that was objected to by the dealers was that of a flat rate for wiring being given by the Hydro. The latter have pointed out that the flat rate is a better proposition for everyone in the industry, and it is now being considered by the Contractor-Dealers' Association. In the month of April, the Hydro had eighty-three wiring jobs done by tenders from the various contractor-dealers; after the wiring had been completed, there was a nice surplus left over for the Hydro. The following flat rates for wiring are being charged by the Hydro:—

Range only	$40.00
Range and spare	$50.00
Range and water heater	$60.00

The above prices apply only for installations in individual frame houses, and not in duplex houses or apartment blocks.

The Hydro have agreed to maintain re-sale prices; should there be an adjustment of prices necessary the executive committee of the Contractor-Dealers' Association will be notified by the Hydro, so that the matter can be discussed.

Arrangements have been made between the Hydro and the Home Appliances Manufacturing Co., Elmwood, Man., that will permit the dealers to purchase community washing machines direct from the factory should they so desire.

Mr. J. G. Glassco, general manager of the Winnipeg Hydro states that he is sincerely interested in the well-fare of the Contractor-Dealers' Association and will do all in his power to establish good-will so that the electrical industry may flourish in Winnipeg.

The Ontario Association of Electrical Contractors and Dealers (Toronto District) recently announced that on and after April 1st, 1922 the wage rate for journeymen electricians will be 80 cents per hour.

To Whom Does the "Radio" Business Belong?

Radio Equipment Will Sell With a Minimum of Effort—It Will Turn Over Rapidly and Yield a Fair Profit—It is Electrical and has no Place in the Hardware or Department Store

Who Does The Radio Business Belong To?

"The electrical dealers," you say, "of course."

But, who is getting this business?

Everybody—the hardware man and the department store are the chief contenders. But everybody is after it—crazy about it, in fact.

Are we, as an electrical industry, going to stand idly by and let these outsiders steal one of our most profitable lines of business? Why are they crazy about it? Because radio equipment sells at sight. Because people come clamoring for it. Because it yields quick returns.

Then they wash their hands of the whole thing and leave it to the electrical contractor and dealer to bear the brunt of any "service" that has to be rendered.

This is the way the electrical industry has been made the goat by the other trades for years past. Ever since the first electric lamp was invented we have provided the powder and shot; they have just pulled the trigger and collected the game.

They are not even decent enough to say "thank you." It has become so much a habit with them to steal the electric merchant's business that they are beginning to look upon it as their right. Read this from a recent issue of "The Dry Goods Economist." They are discussing "radio" and who should sell it, and say:

"It is a case of striking while the iron is hot—a very much overworked expression, but applicable. The stores that get the business first have the best hold on their communities. If the department store doesn't get in while the getting is best, people are going to get into the habit of buying elsewhere—in hardware stores, electrical shops, and so on. And the department store man will have to sit by and see his chance fade away or spend a good deal of extra money and effort taking away from those stores the business he could have had for nothing—or very little—had he got there first."

"Just think of it!" they say, holding up their hands in horror, "the very idea of electrical merchants having the presumption to sell electrical goods!"

Wouldn't it be too bad, though, if we should let these outsiders come in and corner one of the most profitable bits of retail business that has appeared on the horizon of the electrical merchant? Nothing has taken the popular fancy to such an extent in the history of the whole industry as has this radio. The sale of it can scarcely prove unprofitable. The turnover is rapid and the demand so great that only the minimum of "service" is expected. The department store has no more right to it—nor the hardware store—than the electrical store has a right to start selling a new fad in shoes or hosiery, or monkey wrenches or whatnot, just because the demand is great and the profit correspondingly satisfactory.

But are we going to cry over spilt milk—spilled into the coffers of the hardware and department store? Don't let's do it! Let us have backbone enough to write our past losses off as "experience" and set our teeth against spilling any more milk.

We have the solution if we will apply it. We all know what it is. In the first place, the electrical merchants must equip themselves to supply the public demand promptly and fully. In the second case, the manufacturer must stand back of the electrical merchant and give him a reasonable guarantee that irresponsible stores will not be among his competitors. Surely the electrical dealers can rise to the occasion. Surely the electrical manufacturers will stand together and support their own industry to this extent.

Quite aside from sentiment, or the question of right and wrong, there is also the question of expediency. It may not be entirely evident today, or even tomorrow, that the manufacturer will be consulting his own interest by marketing his product through the electrical merchant—the man who understands what he is selling—but a month from now, or three months from now, when the question of service comes up, extensions, enlargements and refinements, then it is certain that the electrical merchant will demonstrate that he is the essential link between the public and the manufacturer. We have no doubt in the world that it will come around to this, but the part that appeals to us as so entirely unreasonable and unfair is that every Tom, Dick and Harry in the way of a storekeeper should be allowed to handle radio outfits when they have no interest in them beyond the profits, and when they may be handled just as quickly by the legitimate dealer who would at the same time sell the necessary amount of service. While the radio industry is young, let us start it on a proper foundation. It will develop much more rapidly and much more substantially and be the means of helping many an electrical contractor-dealer to establish himself more firmly in business so that he may carry on in other lines much more effectively.

There is another phase of the situation, too. It has worked out in the United States—and signs are not wanting that similar conditions are developing here—that a quantity of worthless material, turned out by manufacturers who don't know what they are doing, and handled by dealers who know no more than the manufacturers, is being foisted on the public. After the first flush of enthusiasm is over the public will waken up to the fact that they have not received value for their money and that they have something in the way of radio equipment that is of comparatively little use. All that will have been accomplished, therefore, will be that the radio business will have been discredited in the minds of the public and the products of reliable manufacturers, handled by reliable dealers, will be looked upon with suspicion. This, too, is a situation that seems to call for immediate action, not only that the electrical industry may be protected but that the general public as well may not become the victims of an unscrupulous group of persons who have no interest in radio, or any other electrical appliance, beyond the mere profit it will yield them today and tomorrow.

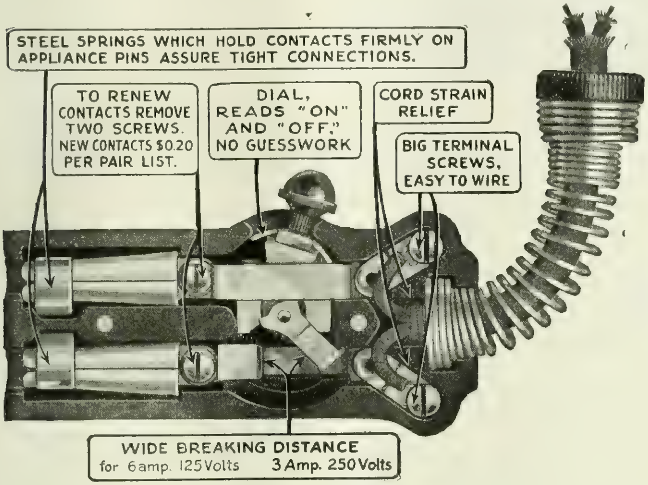
Has Added an Electric Store

Mr. J. N. Lee, electrician, has opened an electric store at 501 College St., Toronto. He formerly had his office and storerooms at 347½ Euclid Avenue. Mr. Lee has had a wide experience in electrical matters. He was 6 years with the Toronto Hydro. in wiring and construction work, meters, etc., being detailed on exhibition work during the autumn seasons. He also spent some three years with the University of Toronto, in the Electrical Department, and for the past four years has been in business on his own account. He contemplates carrying a full line of appliances.

Latest Developments in Electrical Equipment

Bryant No. 651 Switch Plug

An indicating appliance switch plug has been placed on the market by the Bryant Electric Company of Bridgeport, Connecticut, and will be distributed throughout Canada by the Northern Electric Company. This plug is rated at 6 amps. 125 volts, 3 amps. 250 volts. One of its main features is the indicating switch which is made on the toggle principle. To the switch mechanism is attached a dial that clearly indicates whether the current is "on" or "off." Other features embodied include:—steel reinforcing springs which hold the self adjusting contacts firmly, thereby assuring tight connections; large terminal screws that make wiring easy; wide breaking area of switch between jaw and blade; casings are of tough composition material to stand lots of abuse; the cord protector is made of tempered spring wire and stretching won't hurt it a bit; composition bushing in the end saves wear on the cord. It will take either flat or round terminals. This plug fits:—American, Edison, Northern Electric, G. E., Renfrew, National, Manning Bowman, Hotpoint, Westinghouse, Universal, Simplex, and many other makes of heating appliances.


STEEL SPRINGS WHICH HOLD CONTACTS FIRMLY ON APPLIANCE PINS ASSURE TIGHT CONNECTIONS.
TO RENEW CONTACTS REMOVE TWO SCREWS. NEW CONTACTS $0.20 PER PAIR LIST.
DIAL, READS "ON" AND "OFF," NO GUESSWORK
CORD STRAIN RELIEF
BIG TERMINAL SCREWS, EASY TO WIRE
WIDE BREAKING DISTANCE for 6amp. 125Volts 3Amp. 250Volts

A New Storage Battery

H. M. Trade Commissioner, F. W. Field, describes the manufacture of a lead hydrate storage battery by Siebe, Gorman & Co. of 187, Westminster Bridge Road, London S. E. I. The following claims are made for the new battery:

(1) It has 300 to 800 per cent. greater capacity than any other battery of the same size;

(2) its greatest superiority is attained at the highest discharge rates;

(3) it is indestructible as a battery;

(4) it is rechargeable in fifteen minutes;

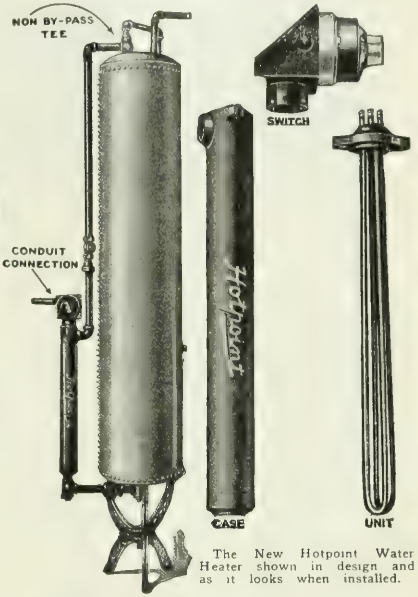
(5) it cannot sulphate; and

(6) it has a very much longer life than any other battery.

While in external appearance the lead hydrate battery differs little from an ordinary lead battery, the plates are very much thicker and the density of the dilute sulphuric acid electrolyte is much greater (Sp. Gr. 1.34 to 1.35). Moreover, the plates are put into stock fully formed and are capable of yielding a discharge voltage of over 2 volts per cell directly they are put in the acid. It is stated that the hydrate paste does not vary in volume under any conditions of charge or discharge, so that the plates do not buckle, and consequently remain unaltered for years.

The Hotpoint Water Heater

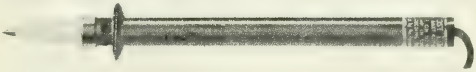
The new Hotpoint water heater that has just been placed on the market by the Canadian Edison Appliance Co., Stratford, Ont., is of the immersion type—efficient and easily replaced. The unit is so constructed that the manufacturers claim its life will be practically indefinite. It is made in sizes of 660, 1,000, 2,000, 3,000 and 5,000 watts, with attached switches, as required. With this immersion type of heating element the efficiency is practically 100 per cent, as the water, passes over the element immediately into the lagged tank, this absorbing and retaining all the heat energy. The arrangement for removing and replacing the element, should this be found necessary, is remarkably simple, requiring only two or three minutes of the electrician's time, the services of a plumber not being required at all. In a number of Canadian cities flat rates are now established for water heating purposes. When using a high efficiency heater, such as the one described above, the cost of operation often does not run over $2. or $3. a month for all the water required in an ordinary house.



The New Hotpoint Water Heater shown in design and as it looks when installed.

Electric Stylo pen

The Post Electric Company, 30 East Forty-second St., New York City, has placed on the market an electric pen, known as the "Stylo-electric." It is used for marking wood, leather and paper, and by the use of colored transfer papers, will burn brilliant tints into leather, celluloid, glass, hard rubber, wood, etc. It can also be used as a miniature soldering iron, on fine work. The Stylo-electric is designed along the lines, and is about the size, of a fountain pen. It



is supplied with two different points, six feet of cord, circuit tap switch, and a supply of colored transfer paper. The manufacturer states that the heat of the point can be easily regulated.

Improved and Simplified New Attachments for Hoover Electric Cleaner

Certain changes and improvements have recently been made in the attachments designed for use with the Hoover suction sweeper. Generally speaking, these changes have been dictated by the desire of Hoover engineers to simplify the design and improve the efficiency of the attachments. The Research Laboratories at the Hoover plant claim they have developed some new ideas which will increase the durability and more than double the cleaning ability of their product. One of the most important improvements is that made in the converter, the device by which the air tools are attached, which has been redesigned to allow the hose to be inserted into the converter opening instead of the converter being inserted into the hose. The manufacturer claims that this change alone increases, to an appreciable extent, the volume of air which passes through the attachments.

It is stated that a new and improved hose will hereafter be furnished. This hose, to quote a statement from the Hoover engineering department, is made with "soft molded rubber ends and covered with a heavy quality of olive-drab colored duck." This covering is very strong and durable and is of such a color that it will not easily show soil from frequent contact with the floor.

In addition to these changes, one of the heavy fibre extension tubes has been curved, at an angle of 45 degrees, which makes it possible to dispense with the 45 degree elbow attachment, thereby reducing, by two, the number of joints in the set of attachments. The Hoover people claim that this will not only remove an obstruction to the air flow at this joint, but will also prevent the parts from becoming disconnected in use.

Changes have also been made in the general purpose brush, which has been "designed to combine the uses of the orifice nozzle, flat rubber nozzle and library brush, into one tool, this tool being separable so that it can be used as an aluminum single orifice nozzle if desired. In addition, the taper on the shank on this combination tool has been reversed, so that the tool enters the hose.

All in all, some rather important improvements appear to have been made which, together with the greater simplicity of design, are destined to increase the popularity of Hoover attachments in the eyes of the dealers and eventual owners. We are told that every possible cleaning need in the home is thoroughly provided for.

Radio in Unsettled Condition

Harry F. Allen, purchasing agent of the Great West Electric Co. Ltd., Winnipeg has just returned from a business trip, having visited Chicago, New York, Toronto, Hamilton, Brantford and Woodstock. He was particularly interested in radio development, but found that this line is still in a very unsettled condition. However, there is lots of room for the contractor-dealer to take care of this line, owing to the fact that it is more or less of a technical nature, and at the present time is in the hands of other people who know nothing of this line. Mr. Allen found conditions generally are getting brighter, with considerable building in progress in the Toronto district.

Exclusive Imperial Headlight Agents

Dating from June 1, 1922, The Ohio Brass Company, Toronto, will act as exclusive sales agent of the Crouse-Hinds Company of Canada, Limited, in connection with the Imperial line of headlights. Imperial headlights are well known for their excellent design, their durability in service and their large variety. There are Imperial headlights—including luminous arc, carbon arc and incandescent types—for every class of electric railway and mining service. The Ohio Brass has had broad experience in the marketing of headlights and is prepared to give adequate service.

Announcement

The Fibre Conduit Company, Orangeburg, New York, has acquired the plant of the American Fibre Conduit Corporation at Fulton, New York, and the conduit manufacturing business of the Johns-Manville Company at Lockport, New York, and has appointed Johns-Manville Inc., as Sales Agent for its products, effective as of May 15th, 1922.

Insulating and Soldering

A catalogue supplement describing their line of insulating and soldering compounds and announcing the extension of that line of products has been issued by the Westinghouse Electric & Manufacturing Company. The publication is known as 5-A, Supplement No. 2.

The Travelers Indemnity Company, Hartford, Conn., has recently included a comprehensive Machinery Policy in its list, under which insurance can be had on engines, fly wheels, steam turbines and electrical units. The company is distributing a folder describing its new policy.

The Department of Railways of the Province of Saskatchewan has issued its annual report for the financial year ended April 30, 1921, copies of which are now available. Interesting information is given regarding the financial and physical status of the Moose Jaw Electric Railway Company, the Regina Municipal Street Railway and the Saskatoon Municipal Railway.

We know of an electrical merchant whose cash sales have been doubled by the addition of radio equipment to his stock.

Mr. A. Harker has recently opened an electrical fixture and supply store at 183 Church St., Toronto. He is displaying a full line of the "Alpha" fixtures, of which he is, himself, the inventor.

Messrs. R. E. T. Pringle. Ltd., Tyrrell Building, 95 King St. E., Toronto, have moved to larger quarters, at 27 Melinda St., Toronto.

A combination stove and heating pad is being marketed by the Ingersoll Electrical Products Co., 109 W. Austin Ave., Chicago. This is a 3-heat equipment, the low heat being used as a heating pad, and the medium and high heat being suitable, chiefly, for the purpose of toasting, warming, etc. The heating element is said to be of new design and permanent and, owing to complete insulation by the use of amber mica and asbestos, all danger of short circuit or

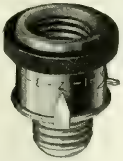
The same company are manufacturing a metallic flexible heating pad, which is made of aluminium and bronze, nickle plated, and also has three heats. A special advantage claimed for this pad is that it may be fastened to the body in any manner; also, it may be used with wet or damp applications. Its metallic construction adds greatly to its variety of applications, without interfering with its flexibility; for example, the pad may be used by a patient or invalid in any position.

A One-man Electric Home

The wiring of the house the installation of the appliances and the advertising for this Home Electric were done by one man, Mr. R. Simpkin of Weston, Ont.—An example that can be followed anywhere.

A Rheostat Regulator

The Wirt Company, Philadelphia, are manufacturing a fan and vibrator regulator. This is a rheostat, as illustrated, which can be used in every electrical home, for the following purposes: to give four speeds to single speed fans; to furnish four distinct speed controls to vibrators without a speed regulator; to give four heat controls to single heat heating pads; to reduce the excessive speed of the spindle on fountain drink mixers; to dim table portables and floor lamps which have two or three lights, where the total wattage of the lamps does not exceed 60 watts; the regulator in this case is screwed into the baseboard receptacle, and portable plug inserted into regulator. The various controls are clicked off by simply turning the fibre ring on the regulator.



Value—Plus Service

A trade mark which means something is that of the Sibbald Electric Co. Ltd., which believes that "Value plus Service equals satisfaction." Any dealer who believes it and acts up to it is bound to find himself doing a good business with contented customers.

VALUE PLUS · SERVICE EQUALS
Sibbald
ELECTRIC CO. LTD.
SATISFACTION

Messrs. Hawkins & Hayward, electrical engineers and contractors, have in hand the work of installing the electrical equipment in the Royal Jubilee Hospital, Victoria.

Introducing New Motor

C. D. Ellsworth, sales engineer of the Century Electric Co., of St. Louis, Mo., recently spent two weeks in Winnipeg and is now visiting the trade in the Prairie Provinces introducing the Century automatic start polyphase motor. This motor is more or less new to Western Canada, although it has been in use in Eastern Canada and the States for the past four or five years. Mr. Ellsworth is very pleased with business conditions in Winnipeg.

Sample Message Printed on the back of Monthly Bill by the Edmonton City Light and Power Department

Why a Monthly Minimum Charge?

So that you can have electric light, or power for a motor, just at any instant you may choose to "snap the switch," certain equipment must be held ready for service at all times. Power plant machinery and all its complicated auxiliaries, poles, wires, transformers, meters and similar engineering equipment together with a number of other technical matters, are all involved in that "snap of the switch."

This equipment and its many operating details are all items of expense, and certain more or less fixed costs exist even although during a certain period, the consumer has very small, or not any energy consumption.. For example, there are interest and depreciation charges, maintenance costs, line and transformer losses, meter reading cost, billing office expense and other items going on just the same.. Of course, adequate revenue from light and power service is necessary to meet these costs, otherwise they might soon cause an increase in general taxation. It is reasonable that the actual electric light and power users should bear these items as part of the cost of service, and this is the case in practice, the Electric Light and Power Department, being operated on an efficient commercial basis, entirely self supporting with a satisfactory margin of profit.

The details of equitably distributing these many items of costs among the various classes of service are part of the highly technical problem which rate-making involves, and it is only possible to here make a passing reference to the matter. However, it may be stated in general terms that these more or less fixed charges are averaged for the various classes of customers. The rates are carefully calculated to include these items, but if you use less than a certain amount of energy consumption each month then the minimum charge is necessary so that you pay your share of such costs for that particular class of service.

Briefly and stripped of many technicalities that is why "monthly minimum charges" exist in our own and practically all other rate schedules.

Current News and Notes

Birchcliffe, Ont.

The Canada Electric Co., 175 King St. E., Toronto, have secured the electrical contract on a $60,000 school building to be erected at Birchcliffe, Ont.

Durham, Ont.

At a meeting held recently at Durham, Ont. the Eugenia Hydro-electric Association was formed.

Emerson, Man.

A by-law authorizing the expenditure of $9,000 for an electric lighting plant at Emerson, Man., was recently passed.

Donnancona, Que.

Mr. J. B. A. Lachance, 12½ Mont Marie Ave., Levis, Que., has secured the contract for electrical work on school building to be erected at Donnacona, Que., at an estimated cost of $43,000.

Halifax, N. S.

The Northern Electric Co., Ltd., Halifax, N. S., has been awarded the contract, by the Halifax city council, for the supply of street lighting equipment for the city of Halifax.

Hamilton, Ont.

Headquarters for the Hydro-electric System, Hamilton, Ont., have been secured by the purchase, recently, of the Bank of North America building, 12 King St. E., Hamilton. The building will be completely remodelled and will likely be ready for occupancy by September next.

Messsrs. Culley & Breay, 35 King St. W., Hamilton, have been awarded the contract for electric wiring on a new school being erected on Dunsmure Ave., Hamilton, at an estimated cost of $425,000.

Mr. Jos. Hartnett, 368 King St. W., Hamilton, Ont., has been awarded the electrical contract on a $40,000 school being erected on Gage Avenue, N., Hamilton, by the Separate School Board.

Mr. Fred T. Brooks, 29 Mary St., Hamilton, Ont., who carries on a sign painting business, has added electrically illuminated signs, the letters of which will be of opalite glass.

Mr. Stanley Lewis, 63 Metcalfe St., Hull, Que., has been awarded the contract for electrical work on an apartment building being erected for Mr. G. E. Hanson, 11 Eddy St., Hull, at an estimated cost of $30,000.

Mr. Raoul Viau, Hotel de Ville Ave., Hull, Que., has been awarded the electrical contract on a music store at 55 Main St., Hull, now undergoing alterations.

Mr. E. Martel, 39 Wright St., Hull, Que., has been awarded the contract for electrical work on an addition being built to the store of Messrs. Fortin & Gravelle at 25 Main St., Hull.

Kingston, Ont.

Work has started on a power house to be built at King St. W., Kingston, Ont., for the Kingston General Hospital and Queen's University, the cost of which is estimated at around $50,000.

Kitchener, Ont.

The Star Electric Co., Kitchener, Ont., has secured the contract for electrical work on eight residences being erected on Rose Ave., Kitchener, by the Star Construction Company, of that city.

The Commercial Electric Co., London, Ont., has secured the electrical contract on an office building located on Queens Ave., London, that is undergoing alterations.

The Vincent & Say Electric Co., 344 Union Ave., Montreal, has secured the electrical contract on the Royal Arthur School to be erected on Canning St., Montreal, by the Protestant School Board, at a cost of about $146,000.

Mr. H. R. Cassiday, 255 Regent St., Montreal, Que., has been awarded the contract for electrical work on a service station being erected at St. Dennis St., between Bellechasse & Beaubien Sts., Montreal.

The Acme Electric Co., Herald Building, Montreal, has been awarded the contract for electrical work on an addition and alterations being made to the pharmacy of Mr. H. Singer, 81 Laurier Avenue W., Montreal.

Mr. J. A. St. Amour, 2171 St. Denis St., Montreal, has been awarded the electrical contract on a public garage being erected at Laurier & Esplanade Avenues, Montreal, by the Savard Motor Supply Co., 124 Laurier Ave.

Mr. G. Houle, 200 Boyer St., Montreal, has secured the contract for electrical work on sixteen residences being erected in the vicinity of Wilson & Terrebonne Aves., Montreal, by Mr. V. E. Lambert, 350 Marcil Ave., at an estimated cost of $168,000

London, Ont.

The Commercial Electric Co., 489 Richmond St., London, Ont., has secured the electrical contract on a store building being erected on Dundas St., London, by the Cowan Hardware Company, London, at an estimated cost of $100,000

Montreal, Que.

Mr. O. Labelle, 326 Northcliffe Ave., Montreal, has been awarded the contract for electrical work on a store and apartment building being erected at 6592 Shebrooke St., Montreal.

J. J. Joubert Co., Limited, 975 St. Andre Street, Montreal, are constructing a 1,000 KW. transformer house, the work being done under the supervision of J. A. Burnett, M. E.I.C., consulting engineer, New Birks Building.

Ottawa, Ont.

Mr. Stan. Lewis, 63 Metcalfe St., Ottawa, Ont., has secured the contract for electrical work on a $60,000 addition to be built to the Arlington Avenue School, Ottawa. Also the electrical contract on a $60,000 addition to be built to the Cambridge St. School, Ottawa.

The Canada Gazette announces the incorporation of the Griffin Radio Manufacturing Co. Ltd., for the purpose of manufacturing and dealing in radio equipment of all kinds and the manufacture and sale of electrical goods. The new firm is capitalized at $2,000,000. Head office: Toronto.

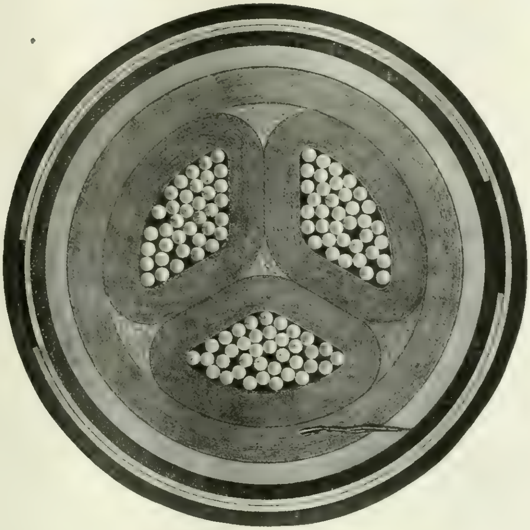
Peterborough, Ont.

Mr. Chas. Bowra, 92 Brock St., Oshawa, Ont., has secured the contract for electrical work on a factory building being erected at Hunter St. E. & Armour Road, Peterborough, Ont., at an estimated cost of $180,000 for the Western Clock Co., Peterborough.

Quebec City, Que.

The Quebec Gazette announces the incorporation of the Canadian Wireless & Electric Co., Ltd., with a capital-

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.

Built to Specification of Hydro-Electric Power Commission of Ontario

---

Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

ization of $20,000. The new firm is authorized to manufacture and deal in electrical goods and radio equipment of every kind. Head office: Quebec City.

Sault Ste. Marie, Ont.

A wireless station was recently opened at Whitefish Point ,Lake Superior, and it is understood that in the near future two stations, one at Detour and the other at Grand Marais, will also be opened. Ships may thus obtain their bearings from these stations in bad weather and fog, and direct their course so as to avoid dangerous rocks, etc.

Summerland, B. C.

The ratepayers of Summerland, B. C., recently voted favorably on a by-law authorizing the expenditure of $12,000 for improvements to the municipal electric lighting plant at Summerland.

Three Rivers, Que.

The North Shore Power Company, Three Rivers, Que., has been awarded the street lighting contract for the city of Three Rivers, by the city council.

Toronto, Ont.

Messrs. Nason Bros., 456 Carlaw Avenue, Toronto, have secured the contract for electrical work on four stores to be erected at Donlands & Danforth Avenues, and four stores recently erected at Danforth & Greenwood Ave., Toronto, by Mr. S. Lumb, 29 Oakdale Crescent.

Mr. Jas. E. Harnan, 42 Arundel Ave., Toronto, has been awarded the contract for electrical work on a $30,000 apartment house being built on Bloor St. W., near Willowvale for Mr. R. Dale, 98 Castle Frank Road; also the contract for electrical work on four stores recently erected at Danforth & Jones Avenues, Toronto, for Messrs. Grant & Leslie, 837 Logan Avenue.

Mr. R. Mitchell, 1174 Danforth Ave., Toronto, has been awarded the contract for electrical work on four stores being erected at Danforth & Woodbine Aves., Toronto; also on eight store buildings nearing completion at Danforth & Greenwood Aves., Toronto.

Mr. R. C. Smith, 704 Shaw St., Toronto, has secured the contract for electrical work on a store and apartment building recently erected at Bloor St. & Brock Ave., Toronto, by Loblaws Groceteria, Ltd., at a cost of approximately $30,000.

Messrs. Richardson & Cross, 81 King St. E., Toronto, have secured the electrical contract on a store and apartment building being erected at St. Clair & Oakwood Aves., Toronto, at an estimated cost of $20,000.

The Western Electric Co., 347 Spadina Avenue, Toronto, has been awarded the electrical contract on a store building being erected at Danforth & Meagher Avenue, Toronto, for Mr. S. MacAluso, 1940 Queen St. E.

The Canada Electric Co., 175 King St. E., Toronto, has secured the electrical contract on the Riverdale Technical School, Toronto, to be erected by the Board of Education at an estimated cost of $600,000.

Mr. J. F. Calverly, 2603 Yonge St., Toronto, has been awarded the contract for electrical work on a store and apartment building recently erected at Yonge & Albertus Ave., Toronto, by Mr. G. E. Williamson, 2497 Yonge St.

Messrs. Cavers & Harvey, 702 Brock Ave., Toronto, have secured the electrical contract on eight stores to be erected at Yonge St. & Manor Road, Toronto, at an estimated cost of $80,000; also the electrical contract on eleven stores to be erected at Yonge St. & Cashin Road, Toronto, at an estimated cost of $110,000, and six stores recently erected on Glebemanor St., North Toronto, at a cost of approximately $60,000.

Messrs. Richardson & Cross have been awarded the electrical contract on a building at 130-140 Bay St., Toronto, that is being remodelled at an estimated cost of $35,000. Also the electrical contract on a building at 43 Adelaide St. W., Toronto, undergoing alterations at an estimated cost of $25,000.

Messrs. Beattie-McIntyre, Ltd., 72 Victoria St., Toronto have secured the electrical contract on a new church and Sunday School building to be erected at Heath St. & Lawton Blvd., Toronto, by the Christ Church Anglican Congregation, at an estimated cost of $100,000.

Mr. J. Everard Myers, Bank of Hamilton Bldg., Gould & Yonge Sts., Toronto, has been awarded the contract for alterations and additions to the electrical equipment of the Booth Memorial Building, Davisville, by the Salvation Army.

Messrs. Ramsden & Roxborough, 36 Front St. E., Toronto, have been awarded the electrical contract on a store building to be erected at 277-279 Victoria St., Toronto, at an estimated cost of $50,000.

Messrs. Harry Alexander, Ltd., 6 King St. West, Toronto, has been awarded the electrical contract on a $50,000 addition being built to the Toronto Conservatory of Music, 135 College St., Toronto.

Messrs. Moss & Stocks, 14 Price St., Toronto, have secured the contract for the electric wiring on a $40,000 addition to be built to the Hughes School, Toronto. Also the contract for wiring a school being erected in Moore Park, Toronto, at an estimated cost of $60,000.

Messrs. R. A. L. Gray & Co., 85 York St., Toronto, have been awarded the electrical contract on two stores being erected at Bloor St. W. & Brock St., Toronto, for Loblaw Groceteria, Ltd., 157 King St. E.

The Flexlume Sales System, Ltd., have moved from 92 Adelaide St. E. to 34 Eastern Ave., Toronto.

Mr. N. McLeod, 808 Danforth Ave., Toronto, has secured the contract for electrical work on eight residences being erected on Millbrook Crescent, near Broadview Ave., Toronto, for Dr. J. A. Gallagher, 2 May St.

Mr. Ed. Griffin, 151 Westminster Ave., Toronto, has secured the contract for electrical work on a store and apartment building being erected at Annette St. & Willard Ave., Toronto, by Mr. J. M. Bentley, 517 Runnymede Road.

Messrs. Nichol & Fagen, 111 Logan Ave., Toronto, have secured the contracts for electrical work on four stores being erected at Coxwell Ave. & Small St., Toronto, by Mr. H. W. Omerod, 21 Chisholme Ave. at an estimated cost of $40,000.

Weston, Ont.

The Weston Water, Power and Light Commission are installing 3/300 kv.a. Packard transformers in their station to take care of the increased demand for both power and light. There is a heavy electric range load in Weston, and the demand for these services is steadily increasing.

Winnipeg, Man.

The McDonald & Willson Lighting Co., 309 Fort St., Winnipeg, has been awarded the electrical contract on the building at 52 Albert St., Winnipeg, owned by Messrs. G. R. Gregg & Co., Ltd., that is to be remodelled at an estimated cost of about $25,000.

Messrs Gamble & Willis, 306 Notre Dame Ave., Winnipeg, have secured the electrical contract on a $100,000 I.O.O.F. Home to be erected at St. Charles by the Odd Fellows Grand Lodge of Manitoba.

In the list of exhibitors at the Electric Show, Kitchener, Ont., printed in our issue of May 15, the name of the McClary Manufacturing Company was inadvertently omitted. The McClary company had a very attractive display.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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What Can We do to Establish An Electrical Merchant Class?

The month of June again brings us to the conventions of the two Canadian central station organizations—the Canadian Electrical Association, which includes all the privately operated companies in Canada, and the Association of Municipal Electrical Utilities, which to date has not extended its activities beyond the province of Ontario and, without doubt, as in former years, delegates will come away from the meetings deeply impressed with the value of the work each of these associations is doing. It is, we believe, unfortunate that certain discussions which had in view the holding of these two conventions at the same time and place did not bear fruit, but next year's efforts may prove more successful. The advantages appear to outweigh the objections.

Having in mind the excellent work being done by both of these associations one must be an egotist to offer criticism on the proceedings. A suggestion is never a criticism, however, and the Electrical News takes the liberty of offering one, believing that its interest in the electrical industry is so well recognized that no member of either of these associations will misconstrue anything we may say.

A chain is just as strong as its weakest link. The electrical industry is a chain made up of six main links—the manufacturer, the engineer, the wholesaler, the contractor, the retailer and the public. The strongest links are engineering and manufacturing. The weakest link—the link that is making it impossible for the whole chain to lift more than a very small percentage of the load the larger links are capable of carrying—is the retailer.

What would we think of a building contractor operating a chain with a weak link, day after day and month after month, and being satisfied to delay progress by lifting very small loads, thus prolonging the time required to carry out his operations to two or three times what it should be? Wouldn't the stupidest contractor see the advantage of strengthing his chain so that his machinery would work to capacity?

Now, doesn't this, to a very considerable degree, portray the electrical industry? Here are two central station organizations—whose primary function, truly, is to supply electric current but whose success and existence depends on the absorption of that current, by the public, chiefly through the greater use of electrical appliances—occupying most of their time at conventions, and devoting most of their energies, to still further strengthening those phases of the industry that are already very strong. It wouldn't be a vitally serious matter if no addition were made to our knowledge of pure engineering for a couple of years, or if the present status of the art of generating and distributing electric energy should remain as it is for the time being. On the other hand, it is, indeed, a tremendously vital problem that we are so terribly weak and lacking in merchandising ability and facilities. The outlet of the industry, so to speak, is clogged and the people who would buy appliances, with very little encouragement, have nowhere to go for that encouragement. We have practically no merchant class.

Wouldn't it be in the interests of the industry if our two central station conventions were at least to give over a greater percentage of their time to the consideration of this problem of merchandising? Looking over the program of the Canadian Electrical Association one sees that of eighteen reports to be submitted in two days, one only deals strictly with merchandising. This will probably narrow down the consideration of this most important problem to about half an hour. We cannot but feel that this association would be well advised to hold a two or three day convention and consider nothing at all but merchandising—ways and means of improving the present unsatisfactory condition of distributing electrical merchandise, through the dealer, to the public.

The same remarks hold good as regards the A. M. E. U. program, which, this year, seems to have overlooked the merchandising end almost entirely.

The crying need of the electrical industry is the development of a merchant class. Both in numbers and quality our retail stores are weak. The few good stores merely serve to emphasize the inadequacy of the others. How shall we go about it to improve this condition, which, as long as it remains, will dwarf the growth of the electrical industry? Isn't it worthy of greater consideration on our convention programs?

Standardizing Color Signals

An important conference, called by the American Engineering Standards Committee, was held in New York on May 23 for the purpose of considering the advisability of standards regarding colors used for traffic signals. The conference included representatives from more than 50 bodies and organizations interested. A quantity of information was forthcoming regarding the extent to which signals are already being used, particularly in steam railway work. It was pointed out that signals controlling railway traffic were already completely standardized and that the proper function of the Standards Committee would be to decide on the course to be taken in connection with traffic signals, as distinguished from signals used by the railway companies. Discussion resulted in the following recommendations:

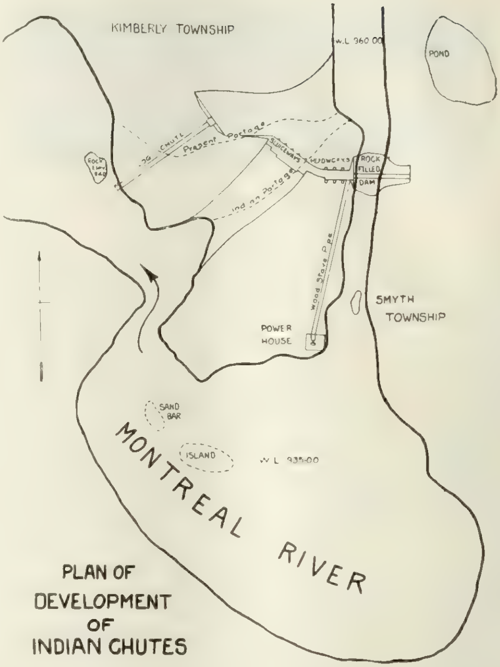
1. It is desirable that there shall be national uniformity in the use of colors for signals.
2. The unification contemplated should include the following items:
   (a) The use of colored lights on all vehicles used on highways.
   (b) The use of colored lights on all signals, both permanent and temporary, along highways and at curves.
   (c) The use of colored lights for highway crossing signals for steam and electric railways.
   (d) The co-ordinated relation of color, position, and number of lights.
   (e). The co-ordinated relation .to systems of flashing, moving, or other similar systems of signals.
   (f) The use of color for non-luminous as distinguished from luminous signals.
   (g) The use of colors for emergency exit signals, and
   (h) Methods of specifying or defining colors for signal purposes.

It was decided also that the A.E.S.C. should form a Sectional Committee for the purpose of furthering the recommendations reached by the conference.

Commencing Work on Power Plant at Indian Chute, Matachewan River

Work has just been commenced by the Matachewan Power Company on a power plant at Indian Chute, Matachewan river. In the district there are two falls in close proximity, each with an approximate head of 48 feet and a capacity, under control, of 6 000 h.p. The Matachewan Power Company will instal three units at the lower falls —Indian Chute—the first unit being already on order. It is expected this unit will be operating by next Christmas. The power will be used in the Matachewan gold camps and the Gowganda silver mines.

Construction work is in charge of H. W. Sutcliffe, of Sutcliffe & Nealands, New Liskeard, Ont., assisted by the following Board of Directors: President, Robt. Fennell, Nasmith & Fennell, Toronto; 1st. vice-president, F. J. Westaway, W. J. Westaway Co., Hamilton; 2nd. vice president, Col. Robt. Stark, president, Stark-Seabold Co., Montreal; D. W. Caldwell, Boyd-Caldwell Co., Perth; Sir H. L. Galaway, D.S.O., London, Eng.



PLAN OF DEVELOPMENT OF INDIAN CHUTES

Well on the Way to Recovery

We are pleased to announce that J. Gordon Smith, manager of the Great West Electric Co. Ltd., Winnipeg, who has been confined to his home for the past two months, with pneumonia, is well on the way to recovery, although it is likely to be several weeks, before he is able to return to business.

Business is Better

Business is better. The depression which began in the United States in 1920 and continued throughout 1921 has passed, and substantial progress has already been made toward normal activity and a new business cycle has been entered upon. Adverse conditions, as the coal strike, may temporarily retard the upward swing. Other factors, such as widespread crop failures, might even result in recession for a time, but no circumstances can alter the fact that there is now an unassailable basis for confidence in slow and steady expansion of the commercial and financial activities of this country.

This basis for confidence is fivefold: First, there is plenty of money to be had at reasonable rates both for short-time and long-time requirements. Second, stocks of finished goods and of raw materials have been reduced to reasonable proportions. Third, commodity prices are stabilizing. Fourth, conditions in basic industries, including agriculture, are improving, and production is expanding. Fifth, gains are not confined to the United States. Conditions are improving throughout the world. Some countries constitute exceptions to this statement, but their bearing on the international situation is not great enough to alter the fact that the world outlook is better, with the United States and Canada in the forefront of improvement.—

Commerce Monthly, New York.

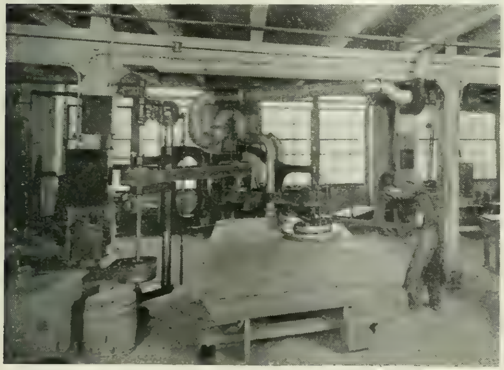
The Application of Electricity in the Manufacturing Industry

Upwards of Three Thousand Wood-working Plants in Canada —Only Small Percentage Fully Equipped Electrically—Millions of Dollars Worth of Business in the Offing

In our last issue we described the uses of electricity in the rubber tire industry. It was shown that the amount of electrical equipment required was very large, that the consumption of electric energy was of very considerable proportions, and that the very existence of the industry may be said to depend on the refinements and efficiencies that were only made possible by the flexibility of electric drive.

The present article—the second of the series—deals in a similar way with the woodworking industry. This is an industry that differs widely from the rubber tire industry. In place of a small number of large and highly developed organizations we find a large number of smaller plants distributed all over Canada, located in every city and almost every town of any proportions. In a recent report of the Dominion Bureau of Statistics, it is indicated that the number of woodworking plants in Canada is in the neighborhood of three thousand.

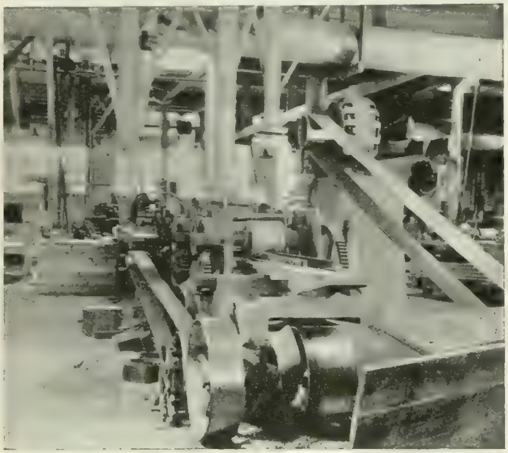
The demand for power in the individual woodworking plants is naturally of comparatively small proportions, but in the total it bulks up large. For example, in Ontario alone, made up of a large number of units of course, the motor installation amounts to well over 10,000 h.p. This item will be mentioned in greater detail later in the article.



Motor-driven, Billiard Table Slate-Finisher—Brunswick-Balke-Collender Co.

In this particular industry, besides giving the benefit of increased efficiency, electricity helps retard the decay of craftsmanship. The woodworkers of Canada are artisans who still stamp their work with a measure of individuality. They do so because their processes are not altogether standardized as is done for the purpose of production on a gigantic scale. The peculiar needs of the industry have something to do with this, but a more potent factor is the economic possibility of running a large number of small plants. These small plants are scattered throughout Canada and their continued operation is largely dependent upon ready access to electric energy. Our extensive distribution of water-power, among its other blessings, has thus helped us to get away from a deadly duplication in houses and furniture.

Over 60 per cent of the plants engaged in the manufacture of lumber into its finished products at the present day, are electric motor driven, and of the remainder a large part are prevented from using electricity only by a restricted supply in the locality in which they are operating.



Individual drive, motor belt-connected to sticker

Economy of Electric Drive

Woodworking machinery is especially adaptable for electric drive, because of the intermittent nature of many of the operations requiring individual drive for the highest economy. It is no uncommon thing to find small plants where such a machine as the sander, shown in Fig. 1, is in use less than 50 per cent of the time. The economy effected by the use of motor drive in such a case is considerable, as the losses due to the turning of non-effective overhead shafting account for a large part of the power consumed. Mr. R.J. Owens, in a recent article in the "Canadian Woodworker," says in this regard: "tests made in a large number of plants have shown conclusively that without motor drive the transmission losses are abnormal—in the majority of cases approximately 50 per cent of the total power consumed."

Individual Drive

Peculiar economies can be effected by the use of individual drive in woodworking plants due to the variation in speeds required by different machines. An engineer who has had a wide experience with this type of drive claims the following advantages for it:—

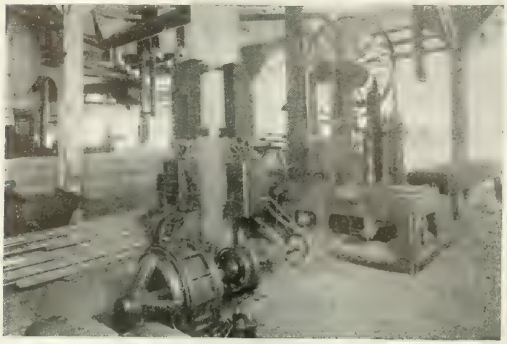
1.—An increased output per machine, due to better control, constant speed and many other features.

2.—Smaller power house or transformer capacity required.

3.—Operating cost minimized.

4.—Increased safety for operators by removing shafting and belts.

5.—Better daylight due to absence of overhead shafting



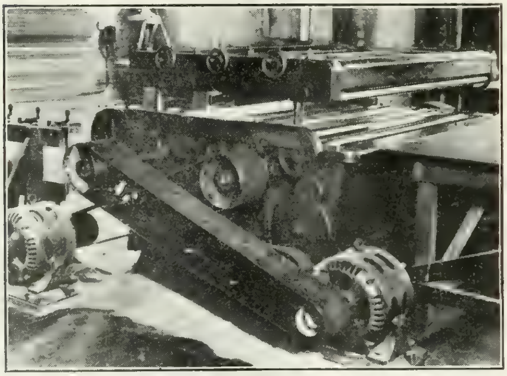
Band resaw direct-driven, using flexible coupling

6.—Permits machines to be placed to best advantage as regards flow of materials, etc.

Motor Selection

The conditions in a woodworking plant, unavoidable on account of the material handled, demand equipment to which there is attached the least possible degree of fire hazard. It will be seen from Fig. 2, which is a normal location, that the motor is exposed to a shower of wood dust. This renders desirable, freedom from moving contacts liable to cause arcing, and requires a sturdy construction capable of withstanding the accumulation of this wood dust deposit.

A motor of the desired characteristics is the squirrel cage induction motor. It not only meets the above requirements but has grown in popularity on account of its even torque and constant speed. Where a variable speed is essential, direct current motors predominate, but latterly, advances have been made in the application of alternating current motors both of the slip ring variable speed and multi-speed squirrel cage type, that makes them applicable under nearly all conditions.



Sander driven by two motors, belt-connected

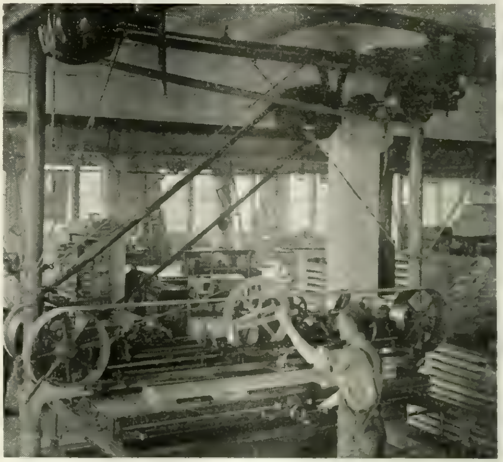
It has been found that a good deal of trouble is caused in some plants through the omission of good protective starting equipment for motors of smaller size than those provided with an auto starter. This results in single phase operation and burnouts, which an oil starter, or oil switch would prevent.

Lighting

In far too many cases that have been under recent observation, it has been found that practically no attention has been paid to the principles of scientific illumination. A drop cord with a bare lamp over each machine or at each workmen's bench with a few more thrown in for general illumination is often considered sufficient.

Design Tendencies

The increased attention being given to the design of woodworking machinery has resulted in the production of some radically different designs, for which high efficiency is claimed. This is generally accomplished by greater speeds and built-in motors. The latest developments include several separate motors on each machine. In some cases the speed demanded is greater than can be obtained with 25 cycle current—a fact that opens an interesting question as to the possibilities of development of motor equipment to meet the demand.



Belt Sander driven by overhead motor—Brunswick-Balke-Collender Co.

Many Plants Electrically Driven

The general tendency in the industry seems to be toward the complete electrification of all possible woodworking operations. That this inclination is of importance to electrical men may be judged by the results from a canvass of the woodworking plants of Ontario. An inventory was recently made of 257 representative factories and it was found that these were equipped as follows:—

Fully motor driven	129
Partially motor driven	46
Steam driven	82

The combined horsepower of the motors installed was found to be 10,570 made up of 547 motors. Of the firms who did not use electric power, the majority intimated that it was because of its non-availability.

Some Plants Still use Steam

There is always a good deal of waste around a woodworking plant. Also, some of the equipment such as kilns and presses, require steam. For these reasons many plant managers cling to the old steam boiler, using their plant waste as fuel, and supplement it with coal. In many cases electric installations are being put in, large enough to take care of the excess power requirements over and above that supplied by the fuel gathered around the plant. This has been done in cases where it has been demonstrated to the satisfaction of the plant manager, that electric power can be bought more cheaply, than the same amount of power can be generated by coal in the plant.

An analysis of the information furnished by those plants which are either partially or completely motor-driven showed that 163 preferred group drive, while 21 had adopted the individual motor system.

Some of the individual installations were as follows:—

20 motors totalling	200 horse-power
20 motors totalling	150 horse-power
20 motors totalling	125 horse-power
9 motors totalling	145 horse-power
9 motors totalling	70 horse-power
13 motors totalling	175 horse-power
44 motors totalling	135 horse-power
14 motors totalling	400 horse-power

An Outstanding Factory

The factory of the Brunswick-Balke-Collender Co., of Toronto, Ontario, is one of the most modern and complete in the matter of electrical equipment.

The machinery is entirely motor-driven requiring a total capacity of 490 horsepower. There are 95 motors, 89 of which are 550 volt, a.c.; the remaining 6 are 110 volt, a.c. This installation takes care of every possible woodworking operation in the factory, and includes the motors required for elevators and ventilation.

The switchboard arrangement is made very simple due to current being received at 550 volts from the supply company. This eliminates transformers, except for two small ones used for lighting purposes.

Group drive is used wherever possible. This is in general where the machines are small, and run at the same speed, as is illustrated by the photographs. The bowling ball and cue machines are driven in this way, and in the phonograph department, the bandsaw, cutoff saw and boring machine are grouped.

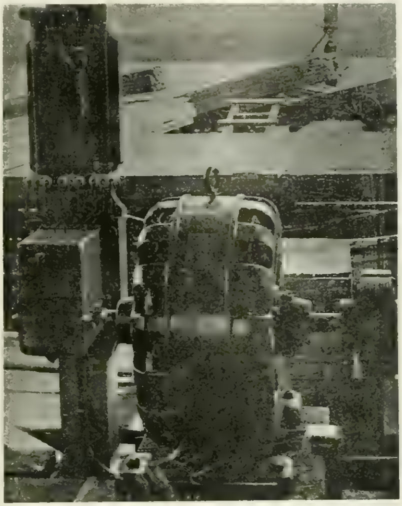
Group Drive—Bowling Ball Dept. Brunswick-Balke-Collender Co.

A saving is made in floor space by mounting motors on specially constructed platforms suspended from the ceiling. This method also avoids the danger of floor level belts. In cases where the construction or location of the machines prevents this method of driving them the motors are placed on the floor and the drive belt is well guarded.

The general result has been the elimination of hand work, and the securing of added efficiency. A flat rubbing machine now does jobs formerly considered the exclusive field of the hand worker. Machines such as moulders or stickers run up to 4,000 r.p.m. and turn out quantities of work undreamed of a few short years ago.

More Motors Needed

An examination of the facts reveals that as a whole the woodworking industry is a field of tremendous possibilities for the application of electrical apparatus. There are in Canada upwards of 3,000 factories engaged in the manufacture of wood into its finished products. Based on the average shown by the 257 Ontario plants, mentioned above, they require 40 h.p. each. This makes a total of 3,000 x 40 = 120,000 h.p. required for the whole industry, in Canada.



50 h.p. motor direct-connected to fast feed planer

It is not easy to strike an average as to the cost of the necessary motor equipment, but putting it roughly at $40 a horse-power, this represents a total expenditure of 120,000 times $40 = $4,800,000. This is for motors alone and does not take into consideration a large amount of auxiliary equipment, transformers, wire, conduit, condulets, lighting fixtures, lamps, switchboards, outlet boxes, and so on, that would very materially increase this sum.

This is not all new business, but much of it is waiting for the electrical salesman. There are comparatively few woodworking plants in Canada that are as fully equipped as they ought to be, and there is a large number of them that have never yet heard the pleasant hum of an electric motor. Just now, while business is none too brisk, would seem to be an opportune time to see what could be done toward placing our 3,000 woodworking plants on a basis of efficiency that can only be made possible through the more general application of electric drive.

A publication, known as circular 1579-B, containing general information and technical data for cutting micarta gears and pinions, has recently been issued by the Westinghouse Company for distribution among gear cutters. The book contains a great amount of useful information for gear manufacturers.

Removing Weeds from Lake at Summer Resort---A Clever Invention

An interesting item comes from Mr. M. Freeman, Commissioner of Public Utilities of the city of Lethbridge, Alta., describing a weed cutting boat, which Mr. Freeman improvised to remove objectionable weeds in a small lake at a summer resort served by the municipal electric railway system of Lethbridge. Mr. Freeman furnishes the following details as likely to be of interest to any electric railway men who may be confronted with similar conditions:

The boat is a scow, of the folowing dimensions; hull, 8 ft. by 20 ft. by 18 in., (a 24 in. depth would be better for rough water.) There is a deck overhang of 2 ft. at the front and 14 in. at the stern, and the paddle boxes extend 24 in. on either side, making over-all measurement 12 ft. by 25 ft. The boat is propelled by paddles 6 in. by 18 in., 4 ft. apart and hinged to endless chains passing over 16 in. sprocket wheels, fore and aft. The motor power is a four-cylinder 60 h.p. automobile engine (though a 40 h.p. would be plenty.)

Parallel with the engine is a counter shaft, connected to the engine by chain drive, ratio 1 to 2½ of the engine. On this counter shaft is mounted an 8 in. diameter, 12 in. face pulley for driving the paddle shaft, extending across the boat near the stern and connected therewith by a 12 in. rubber belt. The paddle drive shaft carries a 20 in. pulley, 12 in. face.

Also on this same counter shaft there are mounted two 16 in. grooved rope pulleys, for 7/8 in. rope; this counter shaft forms the fulcrum for the adjustable frame which carries an endless saw with which the weeds are cut.

The saw frame is of 2½ in. pipe. The side arms, of which there are two on each side of the boat, are attached to collars on the counter shaft and fulcrum thereon as the frame is raised or lowered. These arms are sufficiently long to clear the rear end of the boat, and at the rear end carry a rectangular frame of the same size pipe, attached to which at one upper and two lower corners are band saw pulleys. The upper or drive pulley is 22 in. diameter, 1 in. face, and has a shaft to which is also attached a rope drive pulley 18 in. in diameter. A rope tension pulley is also supplied close to the counter shaft and kept in tension by a heavy coiled spring and threaded bolt, for adjustment. The lower band saw pulleys are 16 in. diameter.

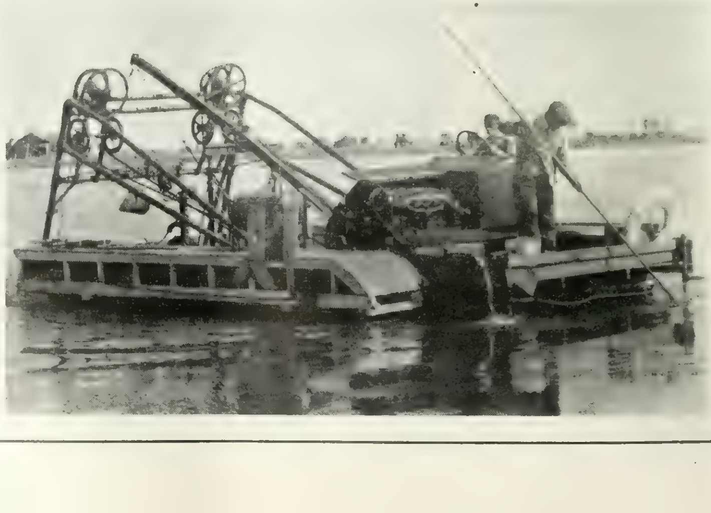
The weight of the saw frame is taken care of by a length of 4 in. I-beam, fulcrumed at a point between the rear end of the boat and the engine, one end being attached to the saw frame at the rear, by wire rope, and the other end carrying a counter- balancing weight. A 3/4 in. 22 gauge, 6 point, endless band saw is used. The saw frame is so balanced that it will lower itself by gravity when released.

The boat has four rudders, one at each corner, for ready control. The engine control, steering wheel and a wheel to raise the saw are all within reach of the operator, so that only one man is necessary. The boat makes four miles per hour and cuts 8 ft. wide, with a minimum depth of 1 ft. and a maximum depth of 6 ft.

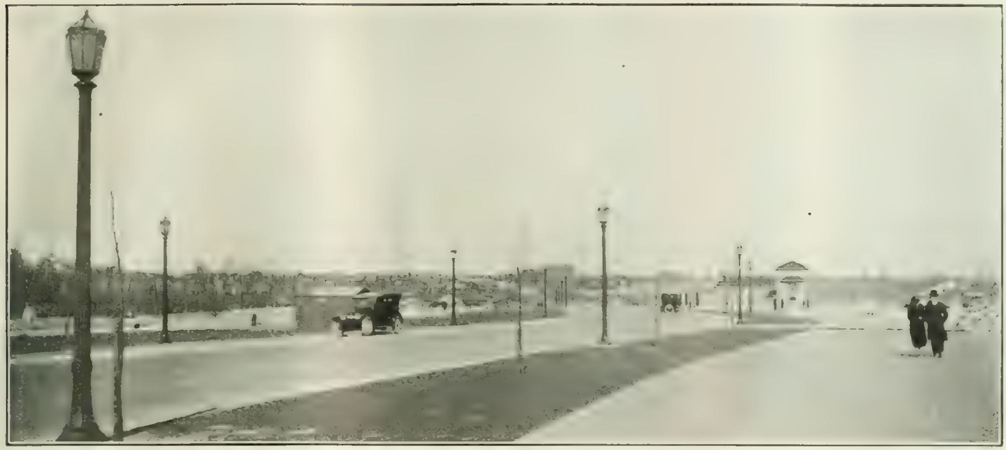
Business conditions, are getting quickly back to a reasonably stable basis, and 1922 shows every promise of being the period, not when the West get back to "normalcy," but when the definite turn came for the better. We have had talk for years, now let us muzzle the human zeppelin and get some action—let us look at the facts that justify the belief that even if 1922 is not prosperity year, it is one long step on the way.—Winnipeg Commercial.

A. I. E. E. at Niagara Falls June 26-30

Special interest is being manifested in the circuit breaker symposium which will be a feature of the meeting of the American Institute of Electrical Engineers at Niagara Falls, Ont., June 26 to 30, inclusive. The papers relate to the Baltimore tests of oil circuit breakers, which are the highest power tests ever made. The papers to be presented are, "Baltimore Oil Circuit Breaker Tests" by H. C. Lewis, Chief of Tests, Consolidated Gas, Electric Light and Power Company, and A. F. Bang, Testing Engineer, Pennsylvania Water & Power Company; "Oil Circuit Breaker Tests," interrupting capacity tests of General Electric oil circuit breakers at Baltimore, by J. D. Hilliard, General Electric Company; and "Tests on Westinghouse Oil Circuit Breakers at Baltimore," by J. B. MacNeil, of the Westinghouse Electric & Manufacturing Company.



Cutting weeds in small lake at summer resort, served by the municipality of Lethbridge, Alta.



Sunnyside Boulevard by daylight—Photo taken from boardwalk

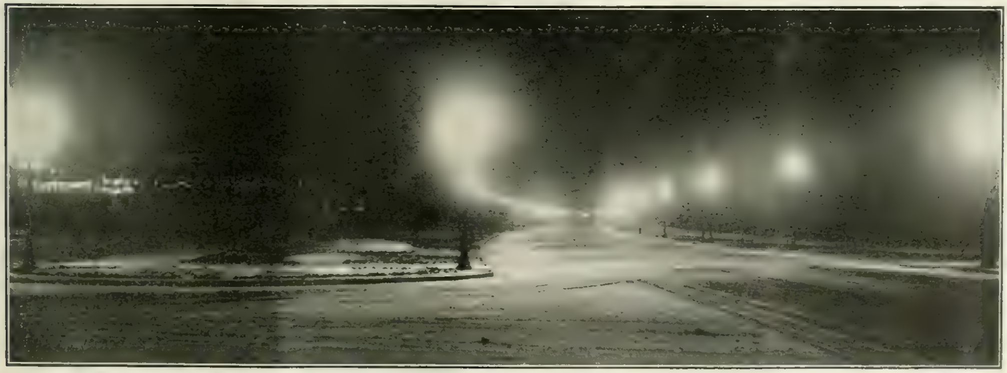
Beauty and Utility in Street Lighting

Lighting System Installed on Sunnyside Boulevard, Toronto, Embodies Many Noteworthy Features — Series System Used

The city of Toronto, situated on the North shore of Lake Ontario, is naturally adapted for parks and lakeshore drives, but not until the recent past did they have a boulevard worthy of any particular note. Some years ago, the city, the Provincial Government of Ontario, and the Dominion Government, each appointed a Commissioner on the "Harbor Board," with the idea of making vast improvements along the waterfront of Toronto. In addition to improving the harbor for shipping purposes, they worked out a scheme for the construction of a boulevard along the entire waterfront of the city, and where necessary, reclaiming the land along the lake shore. Some three or four miles of this boulevard, at the west end of the city, in the Sunnyside district, is now open to traffic.

In the summer of 1920, the question of lighting this boulevard came to the forefront. The matter was one that warranted considerable thought, for although comparatively little of the boulevard had been completed at that time, a lighting system was to be decided upon which could be standardized for the whole length of the waterfront. With this idea in view, arrangements were made between the Harbor Commissioners, who were to assist in choosing a suitable lighting unit; the Property Commissioners of the Toronto city council, whose department was to pay for the installation, and the Toronto Hydro-electric System, who were to install the system and maintain it for the city. These three bodies had therefore to agree upon and determine the lighting system to be used.

After considerable time had been spent on the display of sample units by various manufacturers, it was decided, from an ornamental standpoint and from a maintenance point of view, to adopt an octagonal cast bronze lantern, the unit to be equipped with opalized stippled glass panels on the sides and top, and each unit to be complete with an 8½ inch Holophane dome refractor with a porcelain en-



Sunnyside Boulevard by night—Motorists speak enthusiastically of the splendid illumination amelled top reflector, constituting the refractor holder, so as to obtain the maximum candle power on the road surface.

These lanterns were to be mounted on ornamental poles, the light centre to be approximately 15 feet from the ground, the units being placed 100 feet apart, opposite. The ornamental bronze lanterns and cast iron capitals were supplied by the Canadian General Electric Co. Ltd., the poles being supplied by R. E. T. Pringle; lamps by C.G.E., Canadian Laco and Canadian Westinghouse.

Another point in connection with this system which is worthy of note is the fact that this is the first series system installed in the city of Toronto. The remainder of the street lighting, which consists of some 60,000 lights, is fed from multiple circuits; but after making comparisons on lamp life, costs, and flexibility, between the series and multiple systems, the engineers of the Toronto Hydro-electric System recommended that the series system should be used on this new boulevard lighting scheme. This was then sanctioned, and the system was laid out with a C.G.E. series I.L., 1000 c.p. transformer buried in the ground at the side of each standard, stepping the current up from 6.6 to 20 amperes. On the side streets running off the boulevard, there were erected, on poles, 20 kilowatt pole type R.O. constant current transformers, to feed the system. The ultimate intention is to dig waterproof pits and install these transformers therein. At the present time there is only a 600 c.p., 20 ampere lamp used in each unit, although the capacity of the I.L. transformer is 1000 c.p. A point of interest in connection with this installation is that the entire equipment had to be supplied for a frequency of 25 cycle, as practically the whole of Toronto is supplied with 25 cycle power from Niagara. Cable was supplied by Standard Underground, Eugene Phillips and Northern Electric Co's.

The system has now been in operation several months, and has met with the entire approval of all three bodies who were instrumental in deciding on the lighting scheme. It is without question considered to be one of the most efficient incandescent street lighting systems in Canada. It is also proving a wonderful advertisement, and has created a desire among the citizens of Toronto for better lighting in the remainder of the city. The system is also being continually inspected by engineers from neighboring towns and cities, who speak very highly of it; indeed when any section of Toronto or a neighboring city is considering street lighting, the Sunnyside Boulevard offers an example of a very high standard of illumination.

From the photographs attached, it will be seen that both an ornamental and efficient system has been installed on this boulevard.

Manager of English Electric Co. Visiting Canada

Mr. P. J. Pybus, managing director of the English Electrical Company, is a visitor in Canada. The English Electric Company of Canada, at St. Catharines, Ont., is cooperating closely with the English Electric Company and part of Mr. Pybus' time was occupied in an inspection of the St. Catharines plant. With Mr. Pybus was Mr. John Sampson, of the John Brown & Company. Both of these gentlemen are directors of Power, Traction & Finance Co., Ltd., a British concern comprising five British manufacturing and one financial company, and formed for the purpose of enabling the carrying out of complete contracts of a varied nature. This latter company will operate on the North American continent, it is understood, and will be in a position to compete for any large engineering work that may be required.

"Americans Deserve Business; They Advertise for it"

The Toronto Advertising Club held the final meeting of its season at the King Edward Hotel, May 11. Although the attendence was small, considerable interest and discussion was aroused by the address of Russell T. Kelley, of the Hamilton Advertisers' Agency, Ltd., the principal speaker of the evening, whose subject on "Advertising from a business man's standpoint" permitted a wide expression of opinion.

Mr. Kelley touched upon such matters as national unity, the development of Canadian exports, the establishment of industrial bureau to decentralize industry and build up smaller centres; but the larger portion of his talk, and most of the discussion which followed, centred about the extension of domestic trade in Canadian made goods. The speaker referred to the large consumption here of a particular American soap, the popularity of American clothes, and to the fact that half a million dollars a day is being spent by Canadians in American resorts.

E. Sterling Dean, who was among others to comment on Mr. Kelley's remarks, stated emphatically that if American firms were getting a large share of Canadian business they were entitled to it. "They go after it;" he said, "they advertise for it; they get results. If the Canadian manufacturer really wants the business he can get it by advertising for it. Just to satisfy myself of the extent of American advertising in Canada," said Mr. Dean, "I recently checked over the national advertising in a Canadian publication and found that sixty per cent of it was American. This may not be a fair average for all publications, but it is an indication of the aggressiveness of U. S. firms in this country. Until our own manufacturers become equally aggressive the 'Made-in-Canada' cry will remain largely inoperative." —Marketing.

Automatic Telephone Exchanges to be Installed

The Bell Telephone Company have announced that they will begin almost immediately the erection of an automatic exchange on Main St., near Kingston Road, East Toronto. This will be the first automatic exchange installed in Toronto and will be known as the "Blackstone." A second exchange will follow, which will be located in the down-town district, to take care of additional requirements as they develop. It is not the intention to replace any of the present manual exchanges, except as equipment becomes obsolete or worn out, or as additions may be required. We understand the same policy will be adopted throughout the Dominion, the larger cities receiving first attention on account of greater pressure at those points. Fear has been expressed that with the inauguration of automatic exchanges a number of operators will be thrown out of employment. The company does not anticipate that the installation of automatics can possibly be made at a rate that would make this at all likely or possible.

The towns of Winkler and Plum Coulee, Manitoba, are installing electric light systems, purchasing power from the Manitoba Power Company.

A. T. Hicks, Vice-president

M. J. McHenry, President

S. R. A. Clement, Secretary

Convention of the Association of Municipal Electrical Utilities to be Held in Clifton House, Niagara Falls, June 22, 23, 24

The regular summer Convention of the Association of Municipal Electrical Utilities will be held at the Clifton House, Niagara Falls, Ont., June 22-23-24. Municipal engineers and officials eagerly anticipate a trip to Niagara at this time of the year and it is expected the attendance will very large. A trip over the Chippawa works will as usual be one of the outstanding features of interest.

THURSDAY, JUNE 22

Morning.
Registration.

Afternoon, 2. 30 o'clock.
President's Address.
Reports.
Address—"Public Health as a National and Industrial Asset," by C. J. O. Hastings, M. D., Medical Officer of Health for the City of Toronto.

Evening. 6.30 o'clock.
Convention Dinner.
Address—"Co-operation," by Hon. I. B. Lucas, Solicitor, H.E.P.C. of Ontario. (Tickets may be obtained at time of registration. Subscription $2.50.)

FRIDAY, JUNE 23

Morning. 9.30 o'clock.
Papers—"Modern Street Lighting From Illumination Standpoint," by R. M. Love, Street Lighting Specialist, Canadian General Electric Co., Limited.
"Modern Street Lighting from Construction and Apparatus Standpoint," by M. B. Hastings, Secretary, A. H. Winter-Joyner, Limited.
Discussion.

Afternoon. 2.30 o'clock.
Paper—"Some Peculiar Phases of Allocation of Charges for Municipal Electric Utilities," by R. C. McCollum, Auditor Municipal Accounts, H. E. P. C. of Ontario.
Discussion.

4.00 o'clock.
Baseball Match—Commercial Members, C. H. Hopper, Capt., vs. Utility Members, O. M. Perry, Capt. Indoor equipment. "Clary" Settell, Referee.

M. J. McHenry, as president of the Association, will be Master of Ceremonies, ably assisted by A. T. Hicks of Oshawa, vice-president. S. R. A. Clement, whose indispensable services seem to have made him the permanent secretary of the association will, as usual, be at everybody's service. G. J. Mickler will sit at the receipt of customs.

The program follows.

SATURDAY, JUNE 24

Morning.
Visit to the Queenston Generating Station.
Arrangements have been made with the Hydro-Electric Power Commission to permit delegates wearing the Convention badge to go over the works at Queenston on this morning.

LADIES

Ladies accompanying delegates to the Convention will be furnished with badges which will permit their taking part in the following programme especially prepared for them, free of charge.

THURSDAY, JUNE 22

Afternoon. .4 o'clock.
Tea will be served at the Refectory, Queen Victoria Niagara Falls Park.

FRIDAY, JUNE 23

Morning. 10 o'clock.
Motor Trip Around Niagara Falls, returning in time for lunch.

Evening. 9 o'clock.
Convention Dance (informal.)

Commercial Exhibit

Commercial Exhibit—There will be an Exhibit by the Commercial members which will be open at all times excepting during Convention sessions.

GOLF

Playing privileges can be secured for only a limited number. Those intending to play will send their names to Mr. P. B. Yates, Manager, Public Utilities Commission, St. Catharines.

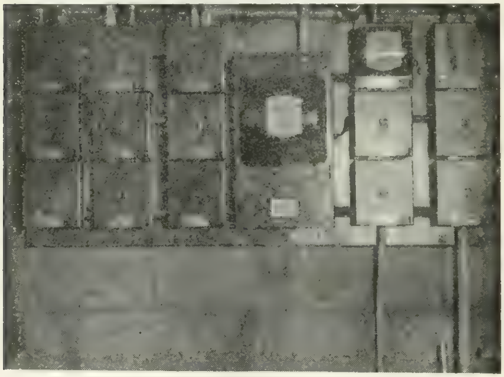
The Electrical Contractor

A Model Wiring Plan For Electrical Contractors—Many New Features—Electric Job Should Cost Five Per cent

Electrical contractors everywhere will be interested in a description of the wiring features of the the model Electric Home that was shown in Hamilton during the two weeks, May 13-27. This is an ideal that every contractor should work to. It not only means satisfaction for the owner but it means larger business for the contractor and bigger sales of appliances for the electric merchant.

It is high time that the wiring of a house for $50., $60., or $75. should have passed into ancient history. Few houses today cost less than $3,000 to $5,000. If the electrical contractor fails to sell himself to the extent of five per cent of this cost he has failed in his duty to the house owner, to say nothing of his duty to himself and the rest of the industry.

The Hamilton Home was well wired. It probably may be said that it is the best wired home in Canada, for its size, to date. Certain things were included that the average contractor may not be able to sell to his customers, though it is difficult to see how anyone can argue that they don't give value in convenience, comfort and saving of time and labor. The house is a model for electrical contractors to work to, and while they may feel they are making progress towards this ideal, they should never be quite satisfied until they have reached it. Some of the most interesting details are given below:



Service Equipment Enclosed in Steel Boxes

The house was wired throughout with BX cables and rigid conduit. Service equipment was entirely enclosed in steel boxes of the safety type, mounted on steel panels; this equipment is shown in one of the figures. The meter was located in a cabinet, so placed that it could be read from the outside of the house, through a glass door; this also is shown in one of the accompanying figures; it is a great convenience in that the meter reader saves a great deal of his own time as well as that of the housewife, to say nothing of the mud he tracks into the cellar. The service conduit was embedded in the solid brick wall.

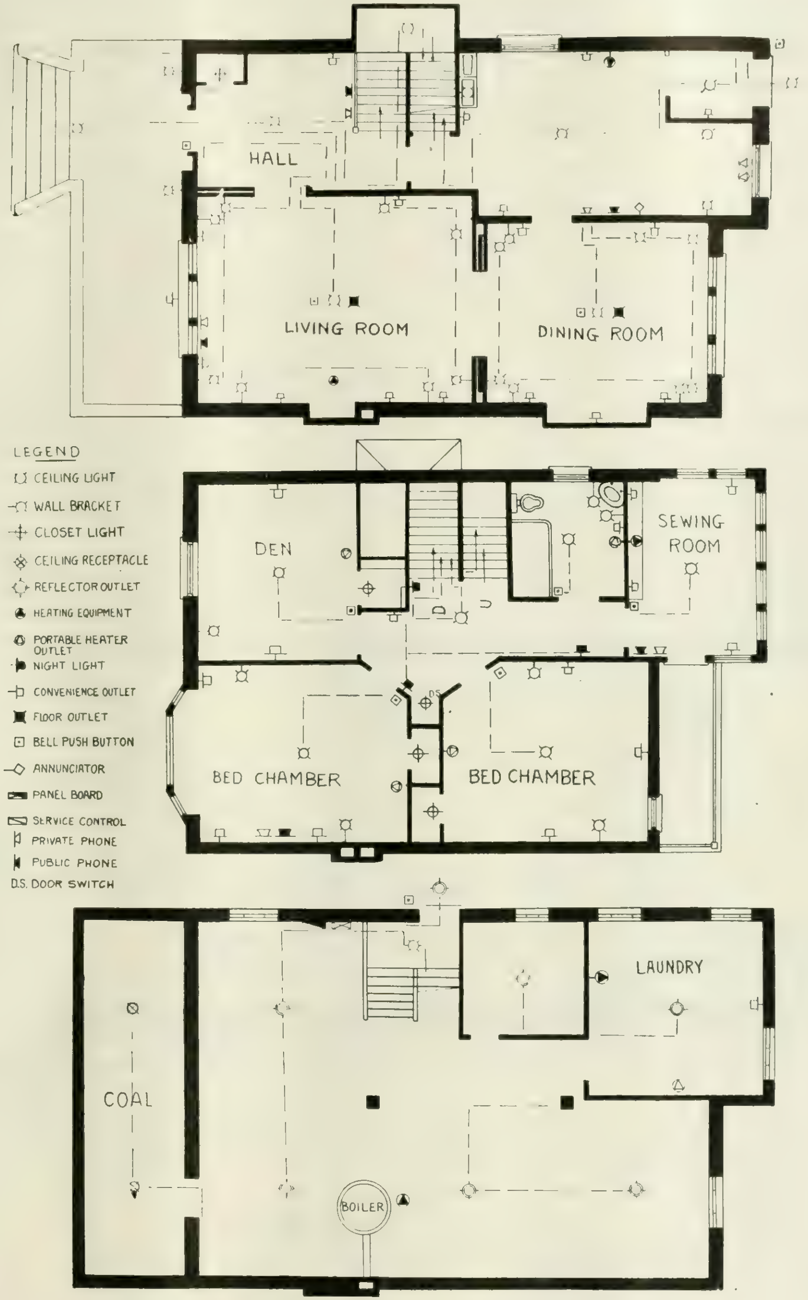
The telephone service was also embedded in the wall in conduit; one advantage of this is that burglars are unable to cut off the service, as frequently happens with exposed wires. Five telephone outlets were conveniently located at different points throughout the Home. This admits of the telephone being carried from room to room and is a convenience out of all proportion to the cost involved.

The wiring of the Home included an illuminated porch number. Night lighting was provided in the halls by means of flush bull's eye receptacles, mounted in the baseboard in the upper and lower halls and on the stairway. Special lighting was provided over the buffet, to give show window effect on the top of the buffet. The china cabinet was illuminated like a show case. The dining room table was wired for a number of appliances, also the tea wagon, the dressing tables in the different rooms, and one of the beds. Every closet had a light outlet.

The meter reader does not enter the house

It was something of an innovation in this Home that the convenience outlets were not placed in the baseboards, but were located about 42 in. from the floor. This arrangement has many advantages, not the least of which is that it avoids the necessity of crouching down to insert or disconnect a plug—an operation none too pleasant or comfortable to people of mature years, to whom, after all, these conveniences should make the greatest appeal.

In the Hamilton Home the kitchen was particularly attractive; a tiny breakfast room occupied an inglenook in one corner and the end of the breakfast table being in prominent view from every point of the kitchen, this was used for a couple of bull's eye switches, one of which controlled the



Wiring Layout in the Hamilon Electric Home—Bx Cable Used Throughout.
See interior views on page 49

water heater in the basement and the other the equipment on the table itself.

A liberal number of ceiling brackets, of the removable and interchangeable type were installed throughout. All mantles were of the electric type, no flues being provided. All the rooms were sufficiently heavily wired to carry portable heaters of the necessary size. The porch lights were controlled by means of a key switch.

It is of interest to note that in the city of Hamilton a flat rate is given for water heaters. The electric water heater in this Home was of the two-element type— 660 watts and 2,400 watts. The 660 watt element was connected ahead of the meter—for which the power company gives a special rate of $1.50 per month. The 2,400 watt element was metered and controlled, as already noted, by means of an indicating switch in the kitchen.

The garage was wired for lighting and provided also with convenience outlets for portable lamps or heater. The ceiling outlets instead of being placed in the centre of the garage, as is usual, were placed near the sides of the ceiling —two on each side.

Selling Better Window Lighting

The opportunity of selling better window lighting exists in most of the stores in your vicinity. Every installation or alteration in a store gives a fine chance for this business. It is not hard to get—if you can show a merchant in a tactful manner, that his competitor's windows are better lighted, you have a strong chance of landing him for an order.

A preliminary step in going after business, is to pick out the most likely prospects. Go around at night, list the poorly lighted windows and note how they compare with others. This will give you a sizeable list. Pick out the cream of these, such as haberdashers, boot and shoe stores, etc., and make up your mind to concentrate on them .

A little advance publicity is the next thing. A reputation for being well posted on lighting matters is a great sales help. Put on a tip-top lighting display in your own window, or co-operate with somebody else, and have your card in the window. You can add some fancy title, as "Lighting Specialist,"—that is, if you can deliver the goods. Three or four good mailings sent out will assist. These letters should be brief and to the point—each containing some little fact on the show window lighting game. If you are concentrating on any particular type of reflector or lamp, enclose a folder showing its uses. Have your name prominently on the folder.

Now comes the actual sales call. The store proprietor is the man to get after, rather than a subordinate. He is the man who spends the money and he is the man to sell on the idea.

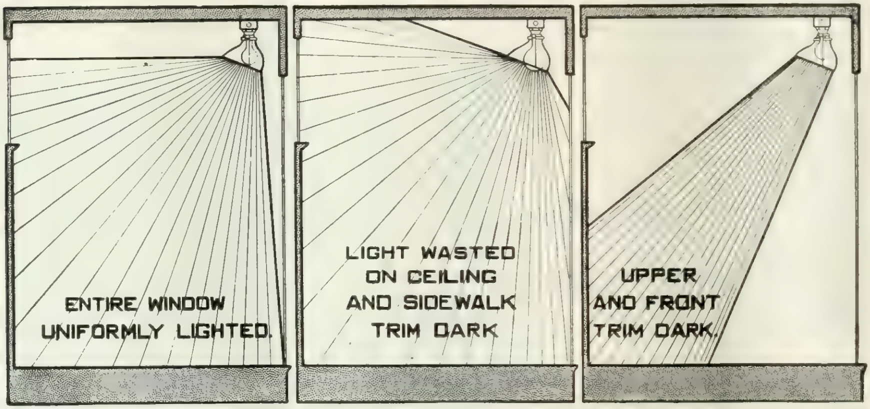
When you go to see him, carry with you a demonstration unit which you can quickly install to show color effects. Be certain to know, in advance, what your costs per unit are, so that the cost of an installation can be figured from the window dimensions.

The actual conversation with your customer can not be laid down by any hard and fast rule. Every man can not be a star salesman, but he can at least approach his prospects in a courteous manner and tell them the facts. Start in with some pleasant remark, in regard to the arrangement of the store, or the briskness of trade, etc. Then get right down to business. Show him to the best of your ability, that better window illumination is a dividend payer.

Do not interrupt the proprietor if he is busy making a sale, and do not back out at the first excuse. It is a mistake, however, to hang on to the point where you antagonize him; retire before that happens and you leave the way open for another call.

Talk to the prospect in his own language, "Foot-candles," " angle of incidence," and so on are Greek to him and just about as interesting. The contractor must know the scientific end, as part of his business, but it is poor stuff to spring on the customer.

Color lighting is growing in use for show window display. New forms of lighting equipment are coming out continually. For example, the spot light tendency is now in evidence and might be worth cultivation. The "show-window-lighting-specialist" must be up-to-date, and he can only do this by keeping in touch with every new thing in his line that comes out.


ENTIRE WINDOW UNIFORMLY LIGHTED.
LIGHT WASTED ON CEILING AND SIDEWALK TRIM DARK
UPPER AND FRONT TRIM DARK.

A point for the contractor—showing how the position of the bulb in a reflector may affect the illumination of a window display.

Contractors in England Take Small Percentage, Too

In England, as in Canada, the electrical contractor does not take a sufficient percentage of the cost of house building. The following table, recently printed in the Electrical Review, gives a good idea of the disparity that exists:—

	Per cent. of cost labor only.
Bricklayers	32.5
Carpenters	24.0
Plasterers	17.0
Painters	7.1
Plumbers	4.0
Electricians	2.4
All others	13.0
	100.0%

BETTER MERCHANDISING

Home Wiring Must be Improved

A Complete Installation at First Saves Money in the End

The electric wiring of the home nowadays is of much more important consideration than ever before, on account of the rapid development of electrical household appliances, and the increasing general dependence of the householder on electricity for both lighting and power.

The cost of wiring in the average home is a very small percentage of the total cost of the building, and only a few dollars stand between a poor installation and a good installation. At the present time there are more poor installations than good ones, which accounts for the fact that so many alterations are made in the wiring of the home after the owner moves in. It is quite evident that the matter of the wiring of a residence is not given enough consideration, either by the owner himself or by the general contractor, who is responsible for the wiring in about ninety-five per cent. of the installations. Certainly as much consideration should be given to the wiring of a home as to a factory or an office building, where architects and engineers are employed to give full consideration to the convenience, original cost, and cost of maintenance and operation of the equipment. The home which is in use twenty-four hours a day should certainly have more consideration and thought given to it than a commercial institution which is only in use for about one third of that time.

It has been unfortunate in many ways that the electrical wiring has been left to the general contractor, as there are two kinds of builders, the House Builder and the Home Builder. The house builder merely puts in a job with a bare amount of equipment in the building, so as to make a quick sale, no thought given any further. The home builder tries to give it full consideration and consults the owner of the house. The house builder has even gone so far as to merely provide some wiring, not even installing the switches or plug receptacles. It is just about as absurd to leave out the switches and receptacles, on an electrical wiring job, as it is to omit the painting, requiring the owner to provide that after he occupies the house.

A concise outline follows, which the home builder can use when he consults the owner, which gives a fair consideration of the modern convenience requirements.

1. Proper ceiling and bracket outlets for each room with necessary switches.
2. Switches to control the first and second floor hall lights.
3. A liberal installation of plug receptacles for portable lamps for living room and bedrooms.
4. Provisions for an electric range in kitchen, electric grate in living room, and a number of heating plugs in living room, dining room, and bed rooms. The above plugs can be used for vacuum cleaners, heating pads, and portable electric heaters for Fall and Spring use, after the furnace has been allowed to go out.
5. Provision for an electric water heater on tank.
6. Make wiring service large enough to accommodate all the above equipment, with at least twenty-five per cent additional capacity for future requirements which cannot be seen at the present time.
7. Provide for a system of call bells and annunciators, and other signal and telephone systems as may be desired.

If a home builder intends to deal honestly with his client he will attempt to consider the above items in consultation with the owner. Some builders may question the above, and say it is too expensive, but on looking into the matter a little closer they will see the amount of money it would save in future expenditures or alterations within a few years, and also have the work concealed. If outlets are not placed properly, more lamps are required to get adequate light. This in itself will cause a larger lighting bill than necessary. This fact is ordinarily overlooked—that it is light and heat you buy from the central station company, but pay for it in the form of killowatt hours, so that the more conveniently the equipment is located and the more efficient equipment used, the less the cost of operation.

Up to the present time there are city and provincial bylaws that regulate certain plumbing and heating requirement but comparatively little has been done by any authorities outside of fire considerations. It will only be a few years before some steps will be taken to make mandatory certain definite requirements so as to conserve the health, eyesight, and good tempers of those who spend most of the time in operating the household, both in city and country.

Plan Now to Make Business Brisk This Summer

The passing of spring, the end of the housecleaning season and the approach of summer bring dealers to a fork in the road. There are two alternatives. You can let business drag—which it has a normal tendency to do during the summer—or you can inject pep into it and maintain a satisfactory volume of sales straight through.

Undoubtedly many dealers are planning, in one way or another, to stimulate business. Some will get an earlier start than others—which brings the thought that, although we are barely entering the summer season, right now is by no means too early to be laying plans! Indeed, there are some dealers who are already conducting campaigns as forerunners of more extensive, sustained effort later on between now and fall. Start now!

The "Universal" Electric Washer

The Great West Electric Co. Ltd., Winnipeg, announce that the "Universal" Electric Washer, which they are beginning to introduce in Western Canada, is receiving favorable comment.

A Hamilton contractor-dealer reports that he has received an order from a customer to install 14 convenience outlets in exactly the same manner as they were installed in the Hamilton Electric Home.

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*By J. H. Schumacher, Treas. & Mgr., Schumacher Gray Co., Ltd., Winnipeg, Man.

Pacific Coast Points the Way in Better Merchandising

Vancouver Electric Merchants' Stores

Among the Finest on the Continent—Strengthening the Weakest Link in the Electric Chain—Central Station and Private Stores Working in Unison

Having sold the electrical idea to themselves, Vancouver electrical men have placed sure ground under their feet in their progress towards selling the idea properly to the public. To gather an outline impression of what the industry is doing in the ambitious coast city, there has been attempted in the following paragraphs, a symposium of some of the methods and practices adopted by a few of the contractor-dealers in Vancouver. Then to sketch in a background, in which one may discern in part at any rate, how they have sold themselves rightly on the electrical idea, it is necessary to draw attention to the enterprise which has been shown in this B. C. city in organization. First there is the Service League, which with a trained secretary-manager is Contractor-Dealers' Association. Next comes the Electric doing great educative work in the industry. Then there is the Electric Club which, once a week at least, holds a meeting at which every branch of the industry is represented, central station, the electrical engineers, manufacturer, wholesaler, dealer and electrician.

Vigorous campaign work is constantly being planned and carried on by the members of the various organizations within the industry. There is in all the effort put forth, the guiding star of co-operation among all the branches. The endeavor of the men in this industry in Vancouver is to have every man in it realize that the interests of all are identified and that only by team-work can the best results be accomplished. The industry as a whole has clear vision on that score. And the attitude of mind, joined with the energetic organization work in which all unite, is accountable for the progress the industry has made and is still making in electrical merchandising in Vancouver.

Possibly no province in the Dominion holds greater things in electrical development for the future. British Columbia is a land of great water powers. It is destined to be a community of great industrial enterprises. To-day its basic industries, such as mining, lumber manufacturing and pulp making, are great users of electric energy, and the stage of development of some of these industries is comparatively small to what it will be in the near future. For instance, the opening of just one more great mine in one district in the province will very probably mean the construction of another hydro-electric power plant of large capacity. It may be that the electrical idea—of doing things the electrical way—has a natural atmosphere in B. C. which fosters the spirit of enterprise the industry is showing.

Selling the Electric Range Idea

"The dominating idea underneath any selling plan for electric ranges is the housewife's pride in her home, and more especially in her kitchen," is the way Jno. Priestman of the sales department of the B. C. Electric Company puts it in describing the successful outcome of a long and uphill campaign to put the electric range over in Vancouver.

Mr. E. E. Walker, sales engineer of the B. C. Electric devised and directed the entire plan of the selling campaign which that company has waged in the past five years, and which is now demonstrating its soundness by its success in bringing in results. Every detail of the daily and monthly efforts made by his staff was closely scrutinised by Mr. Walker and careful note made of every response to those efforts, so that systematic follow-up methods might be adopted.

Discussing the situation of electric kitchen equipment to-day, as the outcome of his chief's successful plans, Mr. Priestman said; "Cleanliness, economy, better cooked food, no fuel or ashes, convenience in planning meals and housework—the final appeal of the clean kitchen—are powerful incentives to induce the ambitious housewife to invest in this modern means of increasing home comfort."

"Public sentiment is in favor of the electric range now. Little time is spent on convincing any one of the practicability of its use. The question now is mainly that of costs. On that score we are able to convince the customer of the economy of the electric range, as compared with either gas or coal. Based on the 3 cent rate per kilowatt, which is what the user of an electric range pays, we have all the data of numerous and exhaustive tests, which show that when used for cooking only, the operating cost is lower. It is an actual fact that it is easier to sell an electric range to-day than it is to sell a coal range.

"To-day in Vancouver and its vicinity there are possibly 600 electric ranges in use. That is what has been accomplished in a campaign extending over five years. In 1916 there were practically no electric ranges in use in this area. In five years from now we confidently expect that there will be 5,000 homes equipped with electric kitchens.

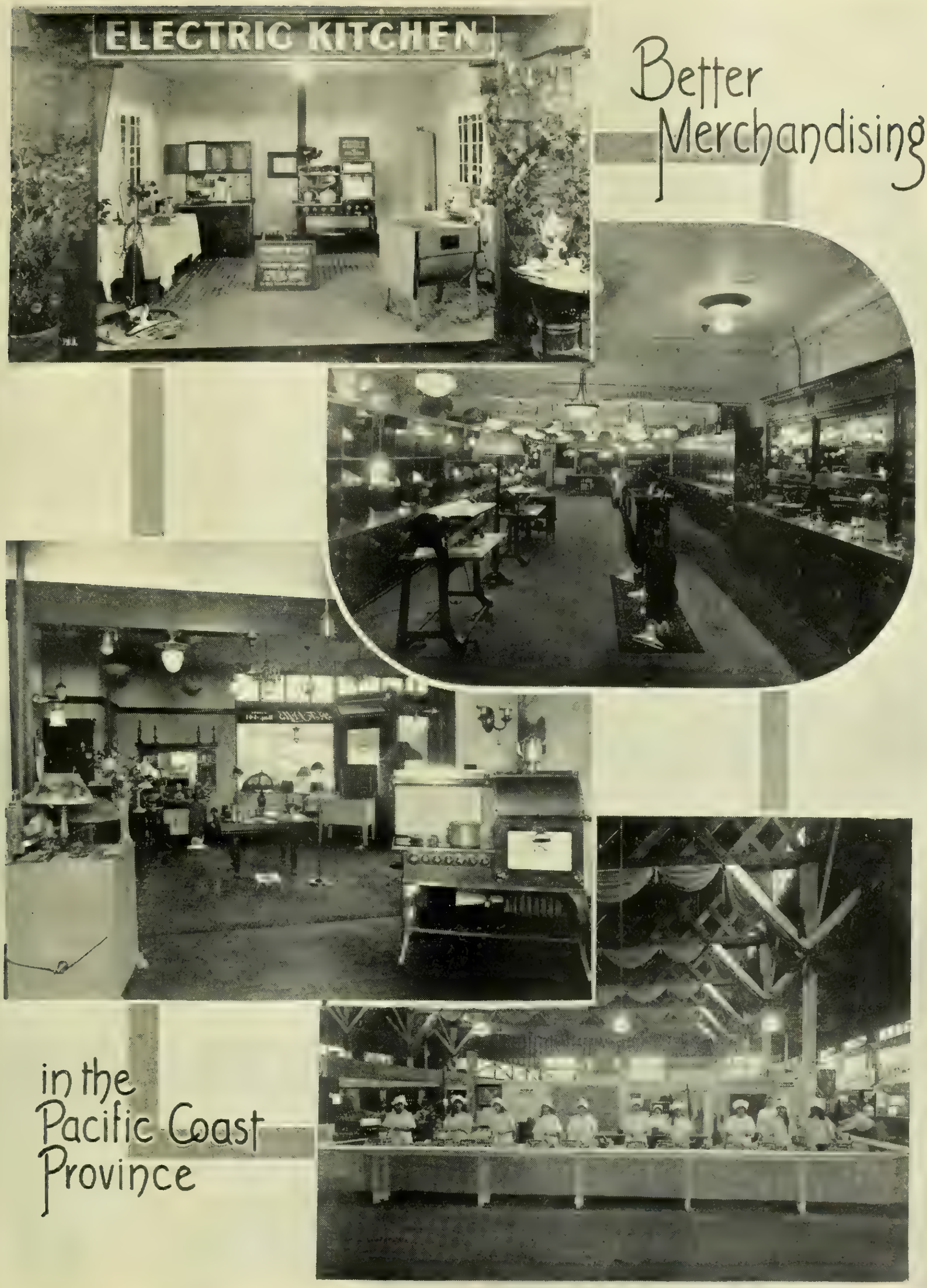
Early Efforts Bore Fruit Slowly

"It took us a long time to make a beginning with the electric range, once the campaign had been decided on," remarked Mr. Priestman, in referring to the time more than five years ago, when Mr. Walker first planned to introduce electricity into the kitchens of Vancouver. "Our very first step was to test out all the different ranges on the market, with the desire to put before the public the best in their interests.

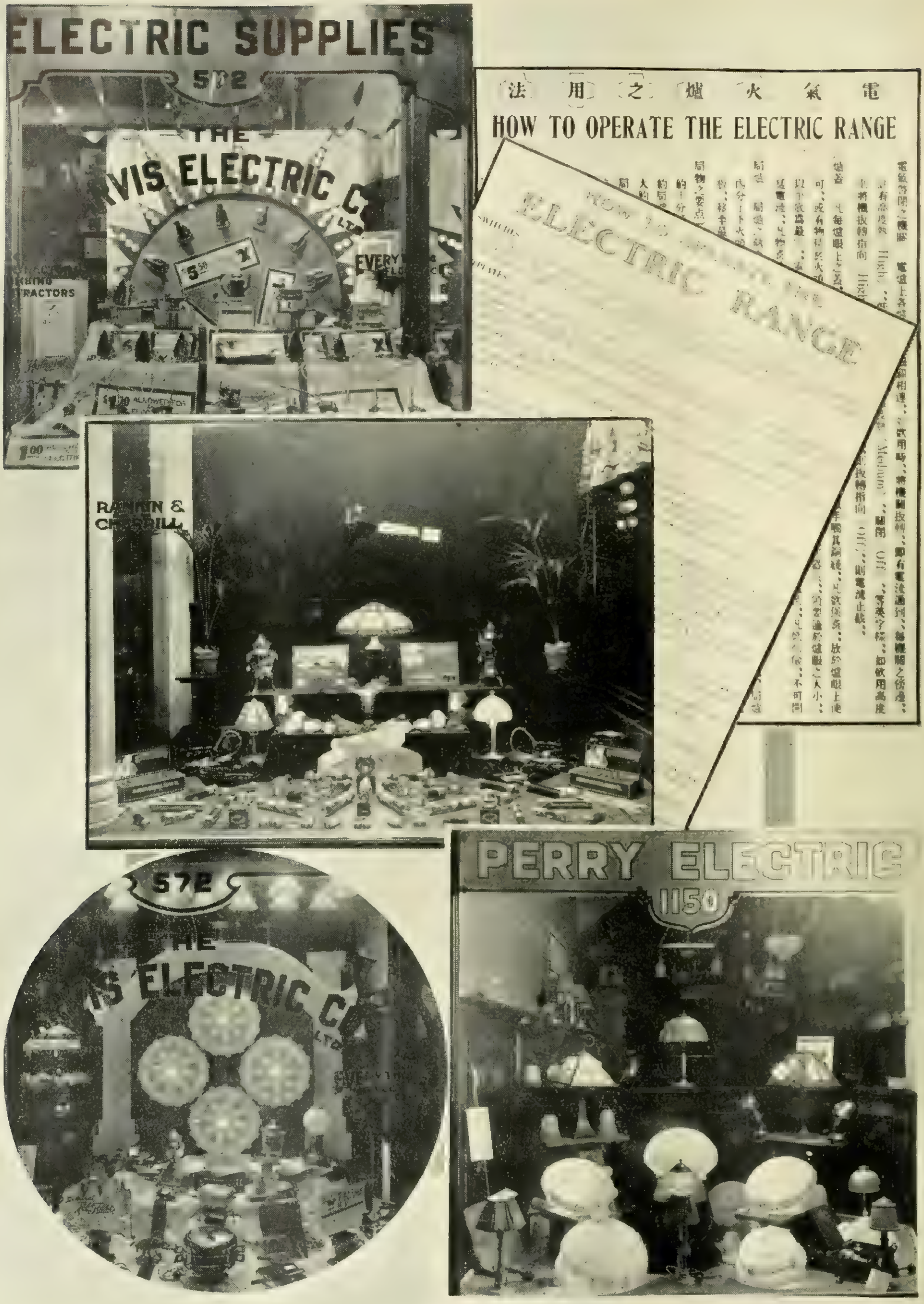
"Our next job was to overcome a very definite prejudice which at that time existed against the electric range. We had to convince the women folk that they could cook on them and that their use was attended with superior advantages. The plan was to demonstrate the ranges constantly in our show-rooms and at the various exhibitions wherever we had the opportunity. Actual cooking was done at all demonstrations and the ladies were invited to see all the familiar culinary processes carried out with electric heat used instead of coal or other fuel. After possibly a year of steady, if slow, progress we began to get results in a small way. Putting out two salesmen to call on likely prospects, selected from a carefully revised list, we got the first two or three ranges installed, and from that on it was comparatively easy to get testimonials and also at times to get per-

(Continued on page 50)

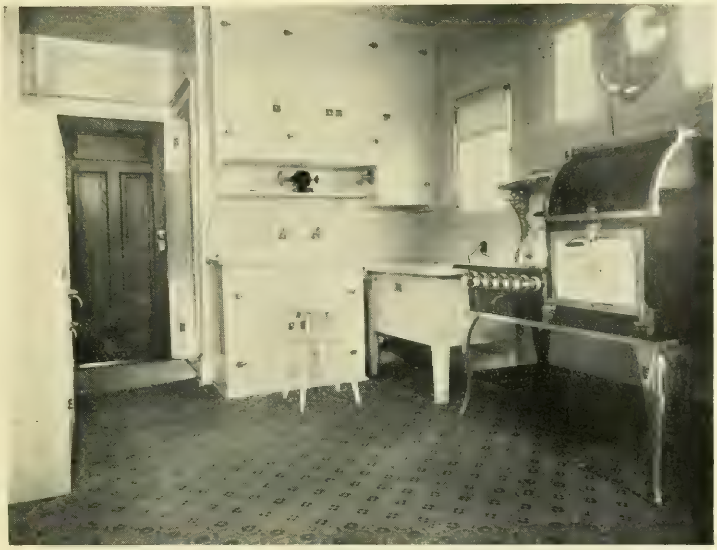
Better Merchandising in the Pacific Coast Province

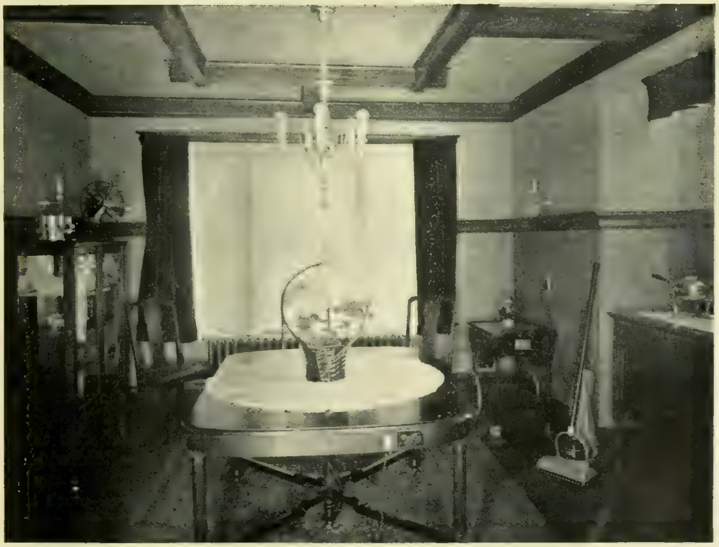


Vancouver Electric Shops Upper left: Typical exhibit of electric kitchen used in numerous demonstration campaigns by B.C Electric Railway Co. Upper right: Interior view Electric Supply & Contracting Company's store, 781 Granville St.—a handsome store. Lower left: Another interior view; this is the attractive store of Percy F. Letts. Lower right: The Domestic Science class giving a demonstration at a recent Vancouver exhibition, using an electric range, supplemented by individual hot-plates



Vancouver Electric Shops. In the upper left hand corner is shown a Hotpoint window entered by the Jarvis Electric Co., in a recent all-Canadian competition; it took second prize. Middle: Rankin & Cherrill's uptown shop; an electrically operated airplane was the drawing card in this window. Lower left: Jarvis Electric Company's window on the occasion of a recent Rotary convention held in Vancouver. Lower right: A special sale of ornamental lamps and shades, featured by the Perry Electric Co. Note in the upper left hand corner an explanation card in both Chinese and English on "How to operate the electric range."





Hamilton Electric Home Above, the Kitchen: note how complete it is, with its ventilating fan, convenience outlets and well placed lights; the "table" in the corner is a dishwasher. Below, the dining room; wired table and tea wagon with many convenience outlets, note the lighting of the buffet, to the right.

mission to invite visitors to see the electric range actually installed in a home.

"In making demonstrations, and through the work of our salesmen making calls, we built up a fairly good mailing list. To-day we work on that steadily. We find we get our best results through a series of letters accompanied by selected printed matter discussing electric ranges. We have also used a monthly calendar, each one being accompanied by a short letter. This spring we have four salesmen out making calls on our list of prospects, in this way following up our mail campaign closely. These men have made a study of their subject and have been trained to talk, demonstrate and sell electric ranges. In that way we have put over the electric range in Vancouver, until, as I have said, there are now about 600 in use and the number is growing steadily.

"One consideration has undoubtedly been helpful to our sales, and that is the sentiment that there is a certain amount of prestige attaching to having an electrically equipped kitchen—every woman is proud to show such a kitchen. In that way it almost invariably follows that putting a range in a house is the means of selling two or three more in the same neighborhood, often in the same block," stated Mr. Priestman. "Another point is that in areas not served by our company's gas system, the time and labor saving and convenience of electric cooking is appreciated. In such districts, especially where there are large homes occupied by people who can afford every comfort, our sales have been good.

"In selling, we have adopted the policy of quoting a man a price for the range installed complete, including the wiring and connections. The buyer appreciates the fact that he knows exactly what the entire cost is to be, ready to turn on the current. He is saved all trouble of letting a contract for wiring after he selects a range. There are no extras, and more than that, a maintenance service is given which we feel is somewhat generous. The manufacturer's guarantee of one year is supplemented by a ready assistance to get the household familiarized with the range and proper methods of using it,—even to the extent of an instruction card printed in Chinese characters for the Chinese cook! We have also found that quite a large number of customers appreciate our system of time payments, which we have arranged to meet the convenience of the purchaser.

"Going with the electric range has been the necessity of providing a hot water supply for the home. Many houses are now being built without a kitchen chimney at all, through the kitchen being designed exclusively for electric equipment. Therefore an electric hot water heater has to be installed. For that a flat rate of $3.00 to $4.00 per month has been given, according to the size of the heater. The rate is based on $4.00 per kw. per month. Continuous heat for the hot water tank is thus provided.

"The cost of the electric range is based on use for actual operating only, not for heating purposes. With that condition it works out theoretically the same cost as gas. The average is one dollar per month per person. That is, a family of five would find their electric range bill run from $4.00 to $5.00 per month. A great assistance in selling electric ranges" commented Mr. Priestman, "has been the improvement in their appearance of late years. Then too, the installation of wiring and connections has been done so that it is practically all out of sight and the appearance of the kitchen is thus greatly improved. And after all that is the great secret—the clean, attractive kitchen—it appeals to the housewife who has to use it. On account of the capital involved in stocking and in campaigning the sale of electric ranges, in our position as the central station, the B. C. Electric Company had to pioneer the field and take the lead. But as with other appliances, which we have almost turned over to the dealers, in time the same course will likely be followed."

Best Thing They Ever Did, Said Mr. Brettell

"This was the very best thing we ever did," said Mr. E. Brettell of the Electric Supply & Contracting Co. Ltd., 781 Granville St., when showing the alterations made to the counter tops of the electrical supplies section of the store. Glass has replaced wood in these tops, and a shallow showcase below has displayed all different types of lamps, etc., with prices and description carefully carded. These are attractively displayed on black velvet cloth, and suitably lighted. The customer looks at the particular item desired—if it is a lamp the salesman at once flashes the switch on a similar one just above and out of the way. Then immediately behind are the cabinets carrying the stock. A decision made, the salesman has no search, the customer no delay, for the stock is carefully kept right behind where the sample is displayed.

"That system is carried out throughout our store," said Mr. Brettell. "We have found it work so well that we have made it a leading feature of our stock-keeping and display. For instance, in large cabinets below counter level, and also below the shelves in which every ornamental lamp and fixture is shown, we have ready for immediate delivery a sufficient quantity of each article to meet at once all likely demands in the course of the day's selling. Naturally, we make it a point to see that this supply is replenished promptly from our storage. The method has the additional advantage that every single fixture or lamp placed in the cabinets below the display has been looked over to see that it is in readiness for delivery."

Carrying out the idea of keeping every department in a definite place, the store is arranged so that the appliances are in one section, the ornamental fixtures in another. On entering the store, large and handsome cabinets, are met, which are devoted to all appliances. This series of cabinets is one of the latest additions to the high class fixtures which mark this modern electric shop. Built of solid mahogany, and costing close to $1,000, these cabinets demonstrate the firm's belief in adequate surroundings for proper display of electric goods. On the opposite wall are arranged shelves, in cellular form, for ornamental fixtures and lamps—one article only being displayed in each. The result is unquestionable—the full value is brought out and no confusion caused as a purchaser passes from one to the other.

This Shop Fits Into Surroundings

Fitting your shop and business to the locality in which it is located is well worked out by Percy F. Letts, secretary of the Vancouver Contractor-Dealers' Association. His shop is in a prosperous residential district. In fact it is the very last shop at the top of Granville Street, and at the boundary of Shaughnessy Heights, into which residential area no shop premises are allowed to be pushed. To appeal to the home instinct Mr. Letts has his show-rooms so arranged that, as he says, "it simulates as closely as possible the atmosphere of the home." Being divided into three parts, all opening into each other and well provided with show windows facing the street, it has been possible to work out this idea. The corner show-room is arranged much like a large dining or sitting room. Fixtures on the wall resemble an old-fashioned sideboard. On this are arranged various lamps and fittings suitable to display there. In the centre of the room is a large dining table. On this a variety of appliances as well as different types of table lamps are arranged from time to time. They are connected up to the lighting or heating circuit by cords carried under the rug which covers the floor. Beside the table, other lamps on tall stands of metal or turned wood are set when suited to the rest of the display. In the window, library and table lamps, household appliances and numerous decorative features are arranged to attract the eye of those passing in the street.

In the second show-room electric ranges, electric washing machines and other of the larger utilities are arranged in effective manner for demonstration. In the third show-room the stock of electric lights and sundry supplies is concentrated, and this is the only portion of this unique shop which is arranged in conventional "store" shape, with counter and shelves. Mr. Letts features wood stands, turned in any variety of cabinet woods, to match both in material, shading and form, the furnishings of any room. Another special feature is parchment shades, done in oils—and real paintings of artistic merit are these. Possibly Mr. Letts' good fortune and success in this attractive feature of his merchandising is due to his fortune in marriage. Mrs. Letts is an artist in oils, of talent and training, and she does these parchment shades so well that they have been bought by customers from Fort George to Winnipeg, and even so far away as Virginia.

Electric Aeroplane Was Attraction

"Our experience with that aeroplane in our window fully demonstrated the value of getting goods out where they can be seen and to show what they can do." said Mr. W. H. Slater of Rankin & Cherrill, talking of the attraction provided by a toy aeroplane which formed the centre of interest in their show window. "It demonstrates also the value of a moving window display, especially for electrical goods, which lend themselves to being actuated by a current, easily arranged, as was done for the aeroplane.

"The tiny plane was driven by electricity from a toy transformer, taken off the regular 110-volt lighting circuit. The wires which held the aeroplane suspended from the ceiling of the show window supply the current to the motor on the plane. This motor drives the propellor and is the only means of running the machine except for a counterbalance at the ceiling to steady the machine and keep it flying in a circle. If run at full speed the plane would cover about a 25-foot circle. The speed can be controlled through the transformer.

"Perhaps the most interesting detail about the display, from a sales point of view," said Mr. Slater, "is the fact that directly from having the machine flying in the window we sold out entirely a stock of these toys which had been dead on our hands for eight years. We had three large ones, three medium size and two smaller. If we had cared to sell the one we still have in the window, we could have done so a dozen times. These planes were made by the Rittenhouse Mfg. Co., at a time when aeroplanes were immensely popular. Later they failed to catch the popular fancy, and we carried them until we were able to display them in the windows of our new store. In our other store we had no suitable space to display them."

Rankin & Cherrill is a pioneer name in the electrical contractor-dealer circles in Vancouver. Mr. H. V. Rankin is the original member still remaining in the firm. Two stores are operated, both on Hastings Street. The uptown shop features very prominently the electrical appliances and handsome electric fixtures stocked by the company. The main store, at 55 Hastings Street, lacked sufficient window and show-room space for the proper and attractive display of the large stock carried. That led to the other store being taken late in 1921.

Uses Window Displays and Bright Lighting

"I am an advocate of window displays, attractively arranged and frequently changed," said Mr. Roy V. Perry, manager of the Perry Electrical Company, "and on the principle of taking our own prescription, we use electric lighting schemes freely in all possible displays. Bright lights are the greatest of drawing cards. This is especially true of selling electric lamps and fixtures as I have proved from experience."

Because of securing larger show window space The Perry Electric Company has taken premises at 985 Robson Street, and is making preparations to close its other shop at 1150 Robson Street.

Small Stores Can Supply Large Amounts of Courtesy

Service means courtesy. It includes as well, attention to the troubles that happen to a customer's appliances, promptness in deliveries, the furnishing of the right materials and so forth—but back of these there has to be an unfailing courtesy that leaves the customer with the impression that he has been well treated. This can be achieved by the small stores just as well as by the large ones,—perhaps better. An incident that occurred recently in the store of a man who runs the business practically by himself, indicates how the principle is carried out and partly explains, by the way, the success of this particular business.

A lady came, somewhat diffidently, into this store the other day. She seemed at a loss until she saw a female clerk behind a certain counter—then she stepped out boldly, and presently was pouring a tale of woe into the ear of the attentive clerk. Her electric door-bell needed attention and her explanaion of the trouble was garrulous, to say the least. The clerk was the recipient of a host of instructions, as to what hour the man was to call, to knock loudly and so on—and right there was where the service came in. That whole volume of talk was listened to without the least sign of impatience; the clerk even appeared interested and agreed smilingly to the most minute instructons. Finally the customer went away happy, certain that her needs would be fully looked after.

It isn't hard to tell what would have been the result if that same woman had happened to drift into some other stores. She would have been snapped off by a brusque male salesman, or shooed out of the way as quickly as possible by a man too busy figuring on his wiring contracts to devote any time to consideration of the vagaries of a door-bell. And that would have been bad business—about the same as telling the customer to go elsewhere. The very fact that she was timid about coming into an electric store and yet came in, showed that at least **she had an idea of the right place to look for electrical work.** That idea should be fostered with the greatest assiduity. The impression carried away by the customer is the thing that counts. Impressions are formed unconsciously, and a good impression brings a customer back to a store.

The employment of one or more women clerks might prove of benefit to some stores. Unquestionably they would require a great deal of training, but they are generally neat in appearance and courteous. Undoubtedly the average woman clerk is superior to the combination wireman-salesman, who is often 90 per cent wireman and 10 per cent. salesman, and whose clumsy handling of customers does a great deal to injure the trade.

An electric merchant in Hamilton reports that he sold a water heater and a range to one of his customers, following a visit of the customer to the Electric Home.

What is the Future of Radio?

The Craze for Cheap Sets is Dying Out—Radio Equipment is Undergoing Evolution—Developments Must be Watched

We have all asked ourselves this question. We have all had it put us many times. At first it may have been a little difficult to answer. Even yet it is quite impossible to foresee what new developments and inventions may bring forth. This much, however, seems certain; if radio sets can be placed in our homes at a reasonable cost, and if they are capable of reproducing music, addresses, news, reports, etc., in such a way as to give us pleasure and profit, the public will find the means of buying them.

Radio development, we believe, will follow lines analogous to the gramophone business. In the early days the reproductions were very imperfect. They lacked "quality." Yet the wonder of the thing created a tremendous public interest and it was only those whose appreciation of quality in tone exceeded their curiosity and enthusiasm who resisted the temptation. The true situation soon asserted itself, however, and the "music box" fell into disfavor. Then came improvements and refinements over a series of years—and with these, of course, added costs—until to-day there are hundreds of thousands of homes where quite expensive phonographs are not only tolerated but enjoyed. The demand for the cheaper machines has almost vanished.

Many signs point to a similar evolution in radio equipment, though the various stages will probably follow one another much more quickly. Already, however, the novelty of receiving messages in this way is losing its hold on the people and they are saying that they want something better—something that is less a strain on the imagination and on the nerves. The craze for ten dollar sets—except with the small boy—has about died out and the average citizen is sitting back waiting for the further development of the art. He is not satisfied with present results but he is enthused with the possibilities and convinced of the value—commercial and otherwise—to such an extent that he is willing to pay anything in reason for a real radio set.

There seems to be only one conclusion to the whole discussion, viz., that just as soon as thoroughly satisfactory and reliable equipment can be placed on the market the better-to-do classes of our citizens will buy them.

Now, what is the proper attitude of the electrical dealer towards radio?

As we pointed out in our last issue, this business, logically and morally, is a part of the electrical industry. The electrical merchant is the ultimate channel through which radio equipment must reach the public. The electrical dealers themselves should assure this by perfecting their knowledge and sales methods in radio matters, and the manufacturer should support the electrical dealer against all outside retail competition. If, in the meantime, "junk" is demanded by the youth of our country it might not be a bad plan to let the department store and the hardware man handle it so that he will become discredited all the sooner in the public mind as a dealer in electrical equipment. However, there is a profit on the sale of this equipment due largely to its rapid turnover and it does not seem to be any sufficient reason why the electrical merchant should not have the profit simply because he realizes that the quality of what he sells is not what it should be or what it will be in the near future. It would seem to be the wisest course, however, for the dealer to watch his stock very carefully and not be caught with a quantity of obsolete supplies on his shelves. It would be well, also, for him to keep in very intimate touch with the whole radio situation so that he may be in a position to offer sound advice to his customers where they seem inclined to appreciate it. He will thus establish himself as an authority on radio and will be the logical person to consult at a later date when this equipment has become more nearly standardized.

Without question, there is going to be a tremendous demand for radio sets when the equipment has been perfected. What man of means will hesitate to pay two or three hundred dollars for such an installation when it gives him first-hand news, entertainment and education all in one? There is another viewpoint; most well-to-do homes own gramophones, yet the phonograph itself is just the begining of the expense. Records costing hundreds of dollars are a necessary acquisition before the phonograph can give satisfactory service. It will not be so with radio equipment. The first expense will, practically speaking, be the whole expense involved.

Then think what a boon a radio service will be to the individual or family, or community, living in an isolated district. Every home under these conditions will become a prospect. The line of demarcation between city and country—which has been largely one of entertainment—will disappear.

The best word for the electrical dealer seems to be—use caution, study the problem, be prepared to take advantage of future developments.

Some Radio Selling Points

The demand for radio supplies continues unabated. Forecasts that the business would prove to be of a very temporary nature, have been disproved, and the market goes on widening. Sufficient time has elapsed since the first rush to allow any mushroom tendencies a good opportunity to manifest themselves, and they have not done so. The public has been won over to radio, and all the electrical dealer has to worry about is keeping the trade in its proper channels, and stocking the right kind of goods.

The development of the radio demand has been much faster than was the demand for the first telephones. It, however, has been very similar. The change in status of the new convenience seems to be progressing along the same lines, at first it was distinctly a novelty, as were the pioneer telephones. At the present time it may be called a very popular luxury or fad. Eventually will come the "necessity" stage—where the telephone is now. It is not too much to say that the fore-sighted dealer will regard this stage as something that is bound to happen and will lay his plans accordingly.

Pick Your Stock

There is such a rush of business in this field that some dealers are buying indiscriminately. The quantity and variety of the goods that can be handled by the dealer are determined exactly by his knowledge of his previous trade. Keep accurate track of your enquiries, and this will give you a line on what you can dispose of.

Nearly every electrical dealer has dabbled more or less in radio supplies already. There was and is a good demand and the stuff had to be obtained wherever possible—the result has been that there is very little standardization and some of the stocks look pretty well mixed up. There is inevitably going to be alteration in parts, and improvements, accessories added and so on, and the man with a mixed up lot of apparatus is liable to find it left on his hands.

In regard to stocking, there is the usual tendency now, when supplies are scarce, to lay hands on as much stuff as possible. This is particularly the case when a dealer has been unable to get a previous order filled. We can picture that Mr. Bill Smith, electrical dealer, has had to turn down a couple of orders for head phones some day this week. The same afternoon along comes Mr. Highflyer of the X—— Radio Company and tells him that if he orders right away he can get three or four dozen head phones immediately. Ten to one Mr. Bill Smith orders as many as he can possibly take, not thinking of the fact that there may perhaps be improved and maybe cheaper phones on the market before he has sold this three or four dozen.

Sales of Parts

It is a mistake to think the sale of parts is not worth catering to. There is a tendency with many dealers to neglect this end of their business. They supply what they have in stock without any painful feelings, but as for studying the demand, and laying in a well assorted stock—well, they simply don't do it. Perhaps this is a reflection of the feeling that existed when radio was confined to a few "bugs." In those days, as now, the items handled were small and inexpensive, and the buyers were exceedingly particular in their choice. The business was infrequent, anyway, and so in general the dealers passed it up as not worth the trouble.

That does not obtain to-day. Now, the people who cannot buy the more expensive assembled sets, or who wish to make up their own, for the pure joy of doing it, are numerous. The little 5-cent or 10-cent sale to-day will lead to more to-morrow. These parts are not so expensive but that a dealer can carry a pretty full line. Display them where they can be seen.

Know More Than Your Customer

There are many demands made upon the electrical dealer in regard to the technical knowledge he is supposed to have. Besides a general knowledge of electricity, the public expects him to understand the scientific side of illumination and the latest call is for information in regard to radio. This is natural enough, and it is easy for a dealer to get to know the subject so that he can tell the customer how to put in the set and get results.

From the standpoint of efficient salesmanship, however, it is not the right thing to tell the customer what he wants to know and let him go. He should be gently led on to the consideration of better equipment. If he has already a set and is purchasing some part therefor, perhaps you can suggest another improvement. Knowledge is power, and there is a distinct change in the attitude of the customer if he finds that the dealer can give him authoritative information. In spite of the publicity that all phases of the subject have been getting, there are still some people who know absolutely nothing about it other than that you hear through phones. They are easily handled at first, but the next comeback demands a little more knowledge on the dealer's part and so on. Many men with a mechanical turn of mind, develop into real radio fans and go in for everything possible. This type demands expert knowledge on the part of the salesman; the dealer who can handle this demand has that part of the trade cornered.

The Follow-Up Business

There are special opportunities in radio merchandising that do not occur to the same extent in the retailing of ordinary appliances. In the great majority of cases, the first stab at the game is made by a customer with the purchase of a $25.00 or $30.00 set. The installation of this outfit satisfies him for a while, but very soon he wants better results,—besides there is the trouble of passing the telephones around to the various members of the family.

The customer generally comes back and enquires about attaching a loud speaker to the present outfit. This is the point where the dealer can sell him one of the more expensive sets. The dealer explains that the loud speaker cannot be attached to the crystal detector type, and with a little salesmanship, sends the customer away with an outfit costing up to perhaps $200.00.

The appeal of radio is to the whole family and to every family. There should be no trouble in placing radio sets in the majority of homes that use electrical appliances. The farm market has not been touched. The business is just beginning, and though we cannot look for a feverish demand to continue forever, there is no doubt that the use of radio will become almost as universal as the telephone. The securing and servicing of this business will add greatly to the prestige of the electrical dealer.

The A. B. C. of Wireless

The transmitting equipment of a wireless station is very different from the receiving equipment. There are in use perhaps a thousand receiving sets to one transmitting set and this is some indication of which apparatus is the most complicated—and also, which is the most costly.

In general, transmitting apparatus is not of interest to the amateur. The apparatus required is expensive and needs much care and adjustment not called for in the operation of a receiving set. We do not promise, therefore, to burden our readers, at the moment, with an unnecessary description of the construction or operation of sending sets. At the present time the general desire is merely to have apparatus that will receive clearly what is sent out from the commercial transmitting stations. The general attitude of the amateur is that knowing there are several excellent broadcasting stations, he wishes to understand the operation of the apparatus that will enable him to pick up the programs they send out.

Wireless Impulses of Wave Form

Wireless communication is carried on by means of radiated waves that are produced electrically—hence the term "radio," from the manner in which the waves are given out.

When a stone is dropped into a pond, radiated waves of water are produced—the ripples spread out in concentric circles. We can see and feel these water waves, and hence know that their rate of travel is relatively slow.

Another example of wave motion is in the production of sound. These sound waves are audible and they travel faster than the water waves.

Light waves are faster still—they go at a rate of 188,000 miles per second. We realize their existence by their effect on the retina of the eye.

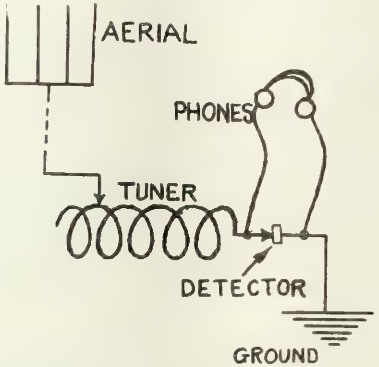
Radio waves travel just about as fast as light waves. They are different from any of the other wave forms we have mentioned, however, in that they can be neither heard, felt nor seen. Their detection can be accomplished only by electrical apparatus that changes the impulses received into a form recognizable by the human senses. This transformation is effected in a more or less satisfactory degree by a number of simple radio receiving sets now on the market.

Simple Receiving Apparatus

In its most elementary form the receiving apparatus consists of five parts. These are:—

(1) An antenna, or aerial. This consists of a wire suspended in the air, between insulators, the purpose of which is to intercept the waves.

(2) An inductive coil or "tuning coil." This is a coil of wire connected through a sliding contact to the antenna. Its effect is to change the electrical character of the receiving circuit in such a way as to permit the reception of waves from any particular sending station. When the coil has been adjusted to one particular sending station, all other waves, unless very powerful, pass through the tuning coil to the ground, unnoticed. By tuning, the workable distance is much increased.



(3) A detector. This is the next link in the chain from the antenna. The most common type is the crystal detector. It consists of a metal point resting lightly on crystals of certain minerals, such as galena, through which the current passes to ground. This detector has the property of rectifying the current so that only the oscillations in one direction are effective.

(4) The phones. These render the incoming signal audible.

(5) A "ground." The system must be well grounded.

Vancouevr to Have Electric Home Exhibit

An Electric Home Campaign has been successfully launched by the Electric Service League of Vancouver. Through a co-operative arrangement with a number of building contractors and supply houses, a handsome residence is being erected in Shaughnessy Heights, one of the most attractive residential districts. The location of the home is such that it is readily accessible to all who may desire to visit the exhibit. Architects Townley & Matheson designed the residence which is now being erected under the general supervision of Messrs. Rush & Reed, contractors.

It is expected the construction of this Electric Home will be completed early in August. While the building is under construction the electric wiring is to be installed to provide for every demand of the most recent advances in electrical service for the home. The work is to be carried out by members of the League. The home is to be handsomely decorated and furnished throughout. Every electrical appliance in modern use will be installed and demonstrated during the period the home is open for exhibition.

While the home "atmosphere" is sought in the building, its interior fittings and exterior surroundings, the Electrical Service League is taking special care that the Electric Home impression will be predominant. In the wiring, in addition to the necessary separate circuits for lighting and service, the arrangement of switches has been most carefully designed. Remote control for almost every part of the house lighting is to be provided, so that the utmost convenience is given for turning on the current in various rooms. In the principal bedroom, designed for the owner of the house, a master switch will throw on every light in the house if desired. In addition, this switch also controls a series of concealed lights under the gables, which flood the approaches to the house with light. It would be an awkward and startling reception for any untimely visitor.

There will be electric fireplaces in one or two of the living rooms, and every provision made for using electric appliances in bedrooms, dining room and kitchen. The laundry arrangements will also include electrical equipment. The kitchen will be equipped with an electric range, water heater and other features. An electric washing machine, wringer and dryer will be placed in the laundry.

At present it is anticipated that the exhibition will be announced for late August or early September. In the meantime the members of the Vancouver League are busy on details of all the plans for the adequate presentation of electric services in the modern home.

E. W. Playford Opens Office in Montreal

Mr. E. W. Playford has resigned his position as assistant district manager of the Canadian General Electric Co. Ltd., Montreal, to engage in business for himself as manufacturers agent, and has opened an office in the New Birks Building, Montreal. He will represent the Dominion Carbon Brush Co., of Toronto and the Dominion Engineering Agency Limited, of Toronto, who are Eastern Canadian representatives for the well known I. T. E. circuit breakers, Sundh automatic control equipment, Garfield moulded insulation, Berry's compound, etc. etc. Mr. Playford has been with the electrical industry in the Province of Quebec for the past twenty years, eleven years of which has been spent with the Canadian General Electric Co. Ltd., having held the positions of construction engineer, district engineer and later assistant district manager. He was previously connected with the R. E. T. Pringle Co., the Montreal Light Heat & Power Co., and for many years was on the electrical engineering staff of the Dominion Textile Co.

E. W. Playford

Mr. Geo. P. Eaton goes to Lincoln Electric Co.

Mr. Geo. P. Eaton, who has been with the Chamberlain & Hookham Meter Company since 1911, and latterly also with the Lincoln Meter Company—as Ontario sales manager for both companies—has severed his connection with these companies and is now Ontario salesman with the Lincoln Electric Company of Canada, manufacturers of electric welding machines and motors.

Winnipeg an Active Electrical Centre

The Winnipeg Hydro is installing underground, two 12,000 volt feeders from the terminal station on Rover Street to No. 5 sub-station in Fort Rouge. The total length of cable is 52 000 feet. It is being manufactured by the Northern Electric Co., Montreal, at a cost of $95,000. A portion of this cable is being installed in conduits that form part of the underground distribution system. For about 14,000 feet, however, the conduits are being laid by the Carter-Halls-Aldinger Co., at a cost of $25,000. The total cost of the new feeders, including conduit construction, cost of conduits, man-hole covers, sewer connections, etc., will be approximately $135,000. Arrangements have been made at two points in the feeders for sectionalizing through disconnecting switches which will facilitate testing in case of trouble. On the completion of these feeders the system of sub-stations will then be inter-connected by a loop feeder system.

Winnipeg Hydro May Install Steam Standby

Mr. Glassco, manager of the Winnipeg Hydro, has stated that during informal discussions in connection with the installation of a standby plant, the general opinion of the committee seems to be in favor of building a plant at an early date. The main question is the size of the plant that should be installed. In all probability one of about 13,500 h.p.. capacity would be put in to start with, with the building and other equipment large enough to take care of at least one additional unit of a similar kind. All evidence gathered to date confirms the original estimate of about $75.00 per kw., that is about $56.50 per h.p. It is pointed out, however, that as the building and various equipment would have to be large enough to take care of the ultimate capacity of the standby plant, the cost per horse power for the first unit would be higher, the above being the estimated cost per horse power for the complete installation.

Attended Western Sales Conference

A. S. Edgar, manager of the Supply Department of the Canadian General Electric Co., Toronto, spent a few days in Winnipeg, on his return from Vancouver, where he attended the Western Supply Sales Conference. Mr. Edgar was accompanied on the trip by Geo. R. Wright, district manager, Winnipeg. The conference was held at the Vancouver Hotel, Vancouver, from the 8th to the 13th May, and was attended by A. P. Horner, district manager, Calgary; D. R. Logan, manager of lamp sales section, Toronto; S. E. H. Smith, Western supply sales inspector; and H. Pim, district manager, Vancouver.

A Change in Distribution Will Improve Service

Conforming with the policy of the Hydro Department of keeping ahead in all the latest improvements in electrical service, changes are being made in the distribution system which will increase the efficiency of the service by giving much steadier voltage, free from the fluctuations which sometimes occur when heavy loads are suddenly put on the lines. The system in certain sections of the city will be changed from what is known as the 3-wire connection to 4 wire star connection common neutral. The result of this change will be that without any additional cost for material they will be able to distribute three times the amount of energy as formerly. For example, in one district that has already been changed they are now able to distribute 27,000 h.p. where only 9,000 h.p. was formerly carried. The cost of installing sufficient equipment to accomplish this end on the old delta system would probably have run to $50 000 whereas by changing to the new system the cost was $7,600 only. By their keeping in touch with the most approved methods the citizens are assured efficient service at the lowest possible rates.

Representing Eastern and U. S. Lines

Mr. Fred E. Garrett, who recently resigned the sales managership of the Great West Electric Company, has opened a sales office in the Confederation Life Building, Winnipeg. He intends to represent some Eastern and U. S. manufacturers, selling the jobbing trade from Fort William to the Pacific Coast. As he has had a great deal of experience in the electrical business in all branches he is qualified to be of assistance to both dealer and jobber in selling his lines. Mr. Garrett advises that as some of his lines are not as yet completed, he is not able to say what all the lines are, but he is ready to announce the following: Ingersoll Machine & Tool Co., Ingersoll, Ont., (Baby Grand Ironer); The Continental Electric Co., Toronto, (Royal Vacuum Cleaner); L & N Manufacturing Co. Ltd., Montreal, (Insuladuct & Loomduct); Trenle Porcelain Company, East Liverpool, Ohio, (Porcelain Products); Holophane Company, (Illumination).

Fred. E. Garnett

A Regular Western Visitor

H. S. Balhatchet, vice-president of the Benjamin Electric Mfg. Co., of Canada Ltd., Toronto, was a recent visitor to Winnipeg, spending four days with Mr. Reg. Smith, western manager of the firm. Mr. Balhatchet makes annual trips to Winnipeg, in order to keep in touch with his larger distributors.

Russell-Fowler Changes

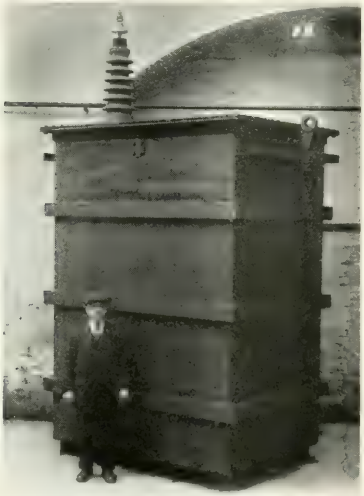
The Russell-Fowler Co., 104, Capitol Theatre Building, Winnipeg, have disolved partnership; the business will be continued by Ray Fowler, at the same address; the name of the firm will not be changed.

The Winnipeg Hydro have placed a contract with Messrs. Julian & Henry, Winnipeg, for the painting of the towers on the old transmission line. This work is now commenced and will be completed before Oct. 15th. The cost of this work will be approximately $9,000.

The Latest Developments in Electrical Equipment

New Type Lightning Arresters

The Westinghouse Electric & Manufacturing Company has developed a new type of direct current electrolytic lightning arresters, known as "Type AR", for car or station use on railway, power and lighing circuits. These arresters, for voltage applications up to 3,800 contain one to 12 cells. Each cell consists of two aluminum plates immersed in a suitable inorganic electrolyte and supported from a porcelain cover clamped by a zinc ring to a glass jar with a gasket placed between the porcelain cover and the glass jar. Hollow concentric cylinders made from sheet aluminum form the plates, the outer cylinder or plate being punched and upset at frequent intervals in order to allow free circulation of electrolyte within the cell. Balancing resistors are used with arresters of more than one cell. These resistors cause each cell to take its proper portion of the line voltage and thereby tend to keep the aluminum hydroxide films equally formed. The arresters are "floated" between line and ground so that a leakage current of only a few millamperes passes continually. This leakage current serves to keep the film upon the aluminum plate or plates in proper order.

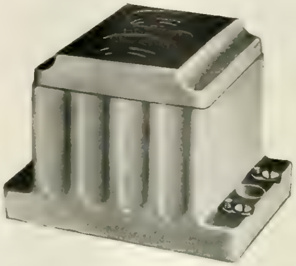


D. C Electrolytic Arrester

The product is capable of passing a surge current of approximately 1,000 amperes at double normal voltage when the arrester is functioning and one arrester should be used for each 500 kilowatts of feeder bus, rotary converter or motor generator capacity to which the arrester is connected. Any voltage in excess of normal line voltage is discharged promptly through the arrester

New Bell Ringing Transformer

The Hydro-electric Power Commission of Ontario requires that the circuit of a bell ringing transformer include a double pole cut-out fused with not over three ampere fuses. In order that a householder may meet this requirement with the least amount of wiring trouble in installing one of these necessary conveniences, the Canadian General Electric Co., has just brought out an a.c. 5 watt, fused, bell ringing transformer in which the transformer is combined with a double pole plug fuse, porcelain covered, cut-out in one unit. To install this device it is only necessary to remove the dry batteries from the bell circuit, mount the fused transformer with wood screws to the wall or ceiling, attach the lighting circuit wires to the cut-out terminals marked "110 volts" and the bell wires to the lower terminals marked "Bell" and the job is completed—meeting all the requirements of any inspection department. The C. G. E. fused transformer is made both 25 cycle and 60 cycle covered by Cat. Nos. CGE113 and CGE114 respectively, and while the term bell ringing feature only is treated, there are many other uses to which it may be put, such as lighting low voltage lamps (6 to 14), night lights, or wherever low voltage alternating current is desired. The device is all porcelain, glazed white, with approximate over-all dimensions of 4-1/8 in. L. x 3-1/4 in. W. x 3-1/8 in. H. Due to its compactness, neatness in appearance and ease of wiring it should become a very popular appliance with the trade.



Rail Bonds for Arc Weld Application

Two new rail bonds, for arc weld application, have been developed by The Ohio Brass Company, Mansfield, Ohio. They are known as Type AW-7, for base of rail application and Type AW-8 for ball of rail application They are shown in Figs. 1 and 2 respectively. The AW-8 bond consists of 2 copper strands formed into a U and welded into steel terminals which, in turn, are welded to the rail. The AW-7 bond is the same in principle; it has a single strand, of any desired length, welded into suitable steel terminals. It is a proven fact that steel to steel is the easiest kind of electric welding and the new bonds conform to this principle. The steel terminals are slightly rounded and provide a wide angle or scarf in which to build the weld. The steel is heavy and will not be burned through by the arc. A copper sleeve, which surrounds the strands at the terminal, shields the wires and absorbs vibration.

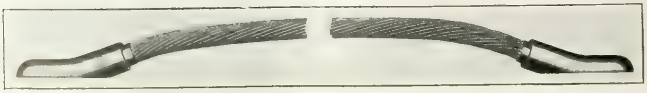


Fig 1—AW 7 Bond

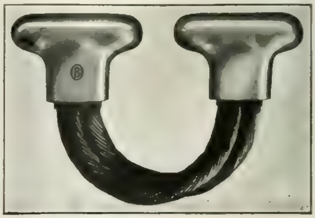
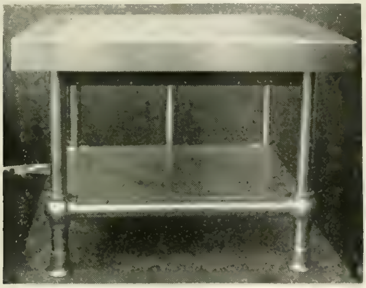


Fig. 2—AW 8 Bond

Heavy Duty Electric Range.

A new venture on the part of the Langley Electric Mfg. Co. Ltd., Winnipeg, is the manufacture of the heavy duty Electric Range shown herewith. Orders have been received from the Provincial Government for the Deaf and Dumb Institute, Winnipeg; and the Nurses Home, Brandon. The current consumption of these ranges is 14 kw., each range having a cooking surface of 24 in. by 36 in. The container element is cast iron, with the elements so arranged that they are accessible and easy to repair.. The frame is of heavy brass tubing, nickle plated. This is said to be the first heavy duty range to be built without an oven; the oven is separate and manufactured by MacNab & Roberts Ltd., Winnipeg. This range is suitable for homes, hospitals, or any concern handling a large number of meals, as it is capable of cooking for 250 people. It is made up of four separate elements.



The Alpha Fixture Company's Showrooms

The Alpha Fixture Company has opened showrooms at 183 Church St., Toronto, where they display a very attractive new line of fixtures, known as the "Alpha." This is described as "an entirely new idea in fixture making and a 95 per cent Canadian product." The distinctive feature of the Alpha fixtures is that they are constructed largely of wood, thus making them easily adaptable to all furniture finishes so that they blend with whatever decoration scheme may be desired.

The Electroplax Company

A new manufacturing concern, The Electroplax Company, Ltd., with a factory in Mount Dennis, Ont., has opened a city sales office in the York Building, Toronto, with Mr. W. M. Davidson, sales manager, in charge. This company manufacture "Redmanol Bakelite" and Condensite phenol resin plastics. They will specialize on electrical insulation and moulded products, wireless insulating equipment, synthetic amber products, and acid and heat proof varnishes and lacquers.

The principals of the firm are: President, H. E. Corey, late of the Standard Oil Company of Pennsylvania; Vice-president, Dr. L. V. Redman, president of the Redmanol Chemical Products Co., of Chicago, 2nd vice-president, P. A. Thompson, of Nesbitt Thompson and Co., investment brokers of Montreal.

B. P. Corey of the Corson Oil Co., Petrolia, Ont., and V. R. Smith actuary of the Confederation Life Co., are Directors.

The British Aluminium Company announce that, beginning May 25, their address will be 592 King St. West. Toronto, instead of 263 Adelaide St. West.

Transformer Load Indicator

The transformer load indicator of the Westinghouse Electric & Mfg. Co., illustrated below, is a device arranged for mounting in place of the drain plug or, preferably, in the side of the tank well a few inches below the oil level, in a distributing transformer, for the purpose of indicating whether any predetermined temperature has been reached or exceeded. When this predetermined temperature is reached, a yellow flag, or semaphore, drops into view to give a visible indication of the fact. The distinctive color and considerable area of this semaphore make it readily seen by the patrolman, from the street.

This device can be used for several purposes, the most important being to indicate when the transformer is overloaded and should be changed for a larger one. Another use is in determining whether transformers operating in parallel are properly dividing the load. The device can also be used to obtain more efficient loading of transformers, since underloaded units can be detected by setting the indicator to trip at a low temperature, in which case the transformer should be replaced by a smaller one.

The indicator consists, in general, of two parts—the indicating mechanism and the plug. The indicating mechanism consists of a base plate, tube, bi-metallic strip, adjusting rig, and cover. The tube fits the inside of the plug and has a threaded piece at the end, which engages the nut in the plug. By this means the indicating mechanism can be inserted in the plug with a turn or two, after the transformer is hung, and can then assume a vertical position without any danger of falling out. The bi-metallic strip set in the end of the tube projects beyond the base plate far enough to hold the flag in position until, through an increase in temperature, this bi-metallic strip bends sufficiently to unlatch the flag, which drops by gravity into the position where it may be observed from the ground. The flag is reset by simply pushing it back into place.

What the Dealers Say About Radio Merchandising

"Department stores are cutting into the business."
"Plenty of enquiries, but few sales."
"Selling lots of parts, principally head phones."
"Can not get enough."
"The kids come in and ask about prices but have not struck much real business."
"Our down town store is doing well but we have cut that department out of our uptown place."
"I could sell all kinds of phones and bulbs but simply can't get them."
"The manufacturers' terms do not suit me and I am not handling that line."
"There is some price cutting on antenna wire. No. 14, bare, has been sold at 40 cents a hundred."
"Little demand for better class of equipment."

Siluminite

The George C. Rough Sales Corporation, Montreal, are now handling, for Canada, a new British insulating material, —"Siluminite"—which possess qualities and characteristics of value to the manufacturer. It is supplied in the form of sheets, short rods, tubes, etc., and can be readily molded during its manufacture to any form or shape desired. It is of a dense black color and takes a fine polish. It is not affected by heat. It is not brittle nor has it any softening points. Immersion in alkali, hot oil or boiling water leaves it unchanged. It is not affected by atmospheric changes. This material is thus claimed to be an effective substitute for slate and marble for switchboards, panel boards, etc., as having very high electrical resistance, thinner sheets can be used, thereby reducing handling and manufacturing costs. Its weight is approximately one pound to 15 cu. in. Its mechanical strength is said to be very great and to excel in this respect porcelain, mica, fibre, ebonite, wood, slate, marble or the molded compounds. It is being manufactured in sheets of standard sizes 48 in. square thickness from 1/8 in. to 1/2 in.; and in sheets 30 in. by 40 in., in thickness from 9/16 in. up to 2 in. It may also be had in all molded forms and shapes.

Selling Electric Ranges Scientifically

The Canadian Westinghouse Co. Ltd., Winnipeg, have been holding a very successful demonstration of their electric range, at the show rooms of the Winnipeg Hydro, for the past month or so. The demonstration has been in charge of a young lady who has had considerable experience in teaching Domestic Science, her mornings are taken up visiting the homes of purchasers and prospective purchasers and the afternoons by baking, in the Hydro show rooms. The company report very good results so far. About a week after a range has been installed in the customer's home ,the demonstrator pays a visit to enquire if the purchaser thoroughly understands the range; if not, she is only too glad to give the required information. This is followed up about a week later by a telephone call, asking if the purchaser is now familiar with the range. In practically every case this is answered in the affirmative.

New Northern Electric Halifax Offices

The Northern Electric Company announce that their Halifax premises have been moved from 67-69 Upper Water St. to 86 Hollis St. The new location is right in the heart of the wholesale district. The building is owned by the Eastern Telephone & Telegraph Company, and the Northern Electric will occupy one half of the lower floor—approximately 40 ft. by 80 ft. and, as warehouse space, all of the second floor. The company reports that business is decidedly on the increase in the Maritime provinces. They recently secured the contract for the installation of a complete new street lighting system for the city of Halifax, which it is expected will be in operation about October 1.

Using Ferranti Transformers

In connection with the Mangahao hydro-electric development being carried out by the New Zealand Public Works Department, Ferranti Limited announce that they have the contract for seven 4000 kv.a., single phase transformers. The transformers are for use in banks of three, forming two 3 phase groups, each 12 000 kv.a., 110/10 500 volts, 50 cycles. They are of the core type, oil immersed, with forced oil circulation. Oil-filled terminals of special Ferranti design are to be supplied for the 110,000 volt sides. The illustration shows the first of these transformers to be completed.

Campbell Mfg. Co.

The Campbell Manufacturing Company (formerly Taylor-Campbell Electric Company) are located at 526 Adelaide St., London, Ont., where they have a well equipped factory for manufacturing their various lines, which include enclosed entrance safety switches, all types of steel boxes and cabinets, cutouts, octagon outlet boxes, box covers, flush switches boxes, tight fitting covers, ground clamps, lugs, switch plates, plug cutouts, fuse plugs, rosettes, knobs, tubes, etc. Mr. E. L. Campbell is general manager of the company. It is one of this company's characteristics that they are unusually careful in the inspection of their goods, as they desire to give the best possible service and believe that this is only maintained by manufacturing their goods the greatest care.

Trade Note

Mr. G. Wilkinson, who operates an up-to-date electrical store at 3031 Dundas St. W., Toronto, has now installed a wireless outfit on his roof, gives concerts every night and carries a full line of wireless equipment in his store.

The Murphy Electric Co., 603 Sayward Bldg., Victoria, B. C., has been awarded the contract for electrical work on a warehouse of Wm. N. O'Neil & Co., situated at 555 Yates Avenue, Victoria, that is undergoing alterations.

The McDonald & Willson Lighting Co., 309 Fort St., Winnipeg, has been awarded the electrical contract on a $170,000 film exchange being erected at Ellice & Hargrave Sts., Winnipeg, by Mr. M. Chechik, 375 Alfred Ave.

The Levvy Electric Company, Ltd., 493 Portage Ave., Winnipeg, have been awarded the electrical contract on the Montreal Trust Building, Portage Ave. & Main St., Winnipeg, that is being altered for a bank, by the Royal Bank of Canada, at a cost of about $35 000.

Messrs. Hawkins & Hayward, 1607 Douglas St., Victoria, B. C., have been awarded the electrical contract on an addition and alterations that are being made to the F. W. Woolworth store at Douglas & View Sts., Victoria, at approximate cost of $55,000.

Mr. W. H. Hughes, 24 Duncaton Ave., Toronto, has been awarded the contract for electrical work on six stores being erected on Danforth Ave., near Woodbine Ave., Toronto, at an estimated cost of $50,000, for Mr. E. J. Furniss, 23 Glenfern Ave.

The Vancouver Harbor Commission, which at present operates a steam locomotive on its two miles of industrial trackage on Granville Island, has decided to electrify the entire trackage on the Island.

Harry Alexander, Ltd., 6 King St. W., Toronto, has been awarded the electrical contract on a $60,000 addition to be built to a Lodge at Dovercourt Road, north of Bloor St., Toronto, the property of the Sovereign Hall Company.

The King Electrical Supply Company, formerly of 300 College St., Toronto, has moved to 288 College St., a few doors east of their old stand, where business will be carried on as before in contracting and supplies.

Electric Railways

Eighteenth Annual Convention Canadian Electric Railway Association Most Successful in History

One must be a true realist to be able to report the business proceedings of a convention under conditions such as surround one during a trip to historic Quebec: a most gorgeous trip down the St. Lawrence from Montreal to Quebec city, May, the ever inspiring month of the year just fading into the even more delightful time; the quaint and picturesque streets of Quebec, recalling the days when even a thought of electricity might have been sufficient to cause one's burning at the stake; the green lawns and boulevards of many shades, with sweetly fragrant and multi-colored plots and beds of tulips, narcissus, geraniums, forget-me nots and lily of the valley, flanked by bushes of lilacs lining almost the whole way from Chateau Frontenac to the Drill Hall, where the convention was held and exhibits displayed; and in addition to all this the ever present and limitless hospitality of the entertainment committee and especially of Mr. and Mrs. W. J. Lynch and Mr. and Mrs. R. M. Reade.

The prevailing spirit of the convention was one of decided optimism as to the development of the country and settling down to serious, real and stabilized and improving business, signs of which are not so much contained in posters like "Prosperity around the corner" and professional optimists' verbose and loud, though meaningless and baseless speeches, as in businesslike analysis of existing conditions and consideration of factors designed to bring the country back to its normal level.

Great stress was also laid on the fact that in street and suburban transportation improved business is possible of achievement at all times if the public is properly catered to and good service given. In the opinion of many present, in the matter of equipment, companies are not considering sufficiently the desirability of basing the size and carrying capacity of the unit upon satisfactory and efficient operation during 90 per cent of the daily service under normal conditions, as against the principle of efficiency and ignoring economy in order to handle temporary overloads during 10 per cent of the time in service.

Sir Charles Fitzpatrick, the Lieutenant Governor of Quebec, welcomed the delegates at the inaugural session of the convention, inviting, on behalf of Lady Fitzpatrick, all the delegates and ladies to attend a garden party in the Government House on the closing day of the convention, the King's birthday. Mr. Gordon Gale, president of the association, presided.

In the course of his address, the Lieutenant Governor said: "I consider no gathering of greater importance than yourselves, and there are no problems more difficult of solution than those of transportation, light, heat and power.

"In Canada we have no coal to speak of save in Cape Breton and in the Rocky Mountains, and we largely depend on the United States. Under these circumstances, we are solving the problem by utilizing our great water powers, and the heating of water by the direct action of electric current would contribute still more to the success of mine, field and forest."

Exhibits

Following Mayor Samson's speech, who in a very appropriate manner welcomed the delegates on behalf of the city of Quebec, Mr. Gale thanked His Honor and His Worship for their kind attendance and also their gracious remarks, and the meeting adjourned to the right wing of the drill hall, which was given over to exhibits; it was formally opened by the Lieutenant Governor, the military band playing delightful selections while the delegates and visitors inspected the exhibits. The Exhibition Committee, consisting of Messrs. R. M. Reade, Quebec R'y. Light, Heat and Power Co.; D. M. Campbell, Preston, Ont.; A. Gaboury, Montreal Tramways; Peter J. Quinn, Quebec R'y. Light, Heat and Power Co., were recipients of many well deserved congratulations. It was decided at the next convention to surpass even this year's exhibit and to improve and enlarge from year to year the exhibit feature of the convention.

Reports

Following an inspection of the exhibits the delegates returned to the Assembly Hall, and the business of the day commenced. The president, Mr. Gordon Gale, vice-president and general manager Hull Electric Railway Co., gave his annual report, in which he said that as a result of the policy decided upon last year, important improvements have taken place. The active membership during the past year has increased 35 per cent, while the associate membership made a gain of 160 per cent.

Relations have been established between the Canadian association and the American Electric Railway Association, the latter of which was represented at the convention by Mr. R. I. Tod, Ex-President of the A.E.R.A., Mr. J. W. Welch, its secretary, and a number of other prominent officials.

Mr. Gale referred to the value of the Exhibition as an adjunct of the convention.

The Secretary's report was delivered by Mr. L. E. Moreland of Hull. He showed a membership of 35 companies as against 27 last year. The associate members are included in 37 companies.

The honorary treasurer, Mr. A. Gaboury, superintendent of the Montreal Tramways, showed a credit balance in the bank which was highly satisfactory.

Social Functions

The first day of the convention a get-together lunch was held in Chateau Frontenac attended by the members, associate members, ladies and guests.

At night a banquet was held, at which over 300 people sat down, under the chairmanship of Col. J. E. Hutcheson, general-manager of the Montreal Tramways. Besides a princely meal and a splendid musical program, which in reality was a concert, the presence of such still famous names as "Veuve Cliquot," "Heidesick," "Mumm" and "Pommery" helped to create a most enjoyable atmosphere.

Following the toast to the King, Major F. D. Burpee, the newly elected president, proposed the toast "Our Guests." This was responded to by Mr. J. A. Welch, secretary of the American Electric Railway Association. Mr. F. S. Neale, Toronto, proposed the toast to the ladies; Mr. Chas. L. Wilson in responding stated that at the first meeting of the C.E.

R.A., there were only sixteen members in all, while at the present convention there were no less than sixty-two ladies registered.

Col. Hutcheson requested Mr. C. D. Henry of Indianapolis, to propose the toast to the Association. Mr. Henry, a former president of the A.E.R.A., stated that it had been his privilege to be connected with the Association for a number of years in the United States and added that the good work of the Canadians had been known, his reason for attending the convention being a desire to meet the Canadians face to face and to join with them in the development of the industry. Nothing was better for industry than that all work together. Individual efforts, no matter how strong, could not accomplish what a united effort could. Co-operation is the secret of success.

Mr. Gordon Gale, responding to the toast, drew a comparison between the first meeting of the association when some sixteen members were present, and the present convention where there were some three hundred registered. He also dwelt briefly on the ultimate aim of the Canadian Electric Railway Association.

Major F. D. Burpee, president

Mr E. A. Robert, Hon. president

Mr H H. Couzens, vice-president

Dancing and general hilarity held sway till late after midnight.

The second night of the convention was rendered no less enjoyable by a ball and a late dinner. Those two chief events of the social program of the convention were supplemented by afternoon tea parties, sight-seeing trips by street cars and boat, including a visit to the famous Quebec Bridge.

Papers

The first paper to be read and discussed was "Valuation of street railway assets, their maintenance and depreciation" by Dr. Louis Herdt, consulting electrical engineer, of Montreal. Discussion was led by Mr. H. E. Weyman of the Levis County Railway Co. Other papers were: "The Modern Street Railway Motor" by J. K. Stotz, Canadian Westinghouse Co., the discussion being led by W. G. Gordon, transportation engineer, Canadian General Electric Co.; "Welded Track Joints" by E. B. Entwistle, Loraine Steel Co., the discussion was led by W. F. Graves, chief engineer, Montreal Tramways Co., and "Motor Buses and Trackless Trolleys" by D. E. Blair, superintendent of rolling stock, Montreal Tramways Co., the discussion was led by W. M. Manz, of the Ohio Brass Company.

The last mentioned paper was undoubtedly of unusual interest to all the delegates and caused the most discussion. There were two particular reasons for this: the newness of the subject, which is rapidly becoming of great importance and concern to the tramways companies of this continent, and is resulting in an extensive research, mainly theoretical as far as the trackless trolley is concerned, as the application of this means of locomotion is hardly even in a pioneering stage either in the United States or in Canada; secondly, the form in which Mr. Blair prepared his paper—a form which if adopted as a standard by all conventions would develop business-like exchange of ideas covering the subject in a thorough and orderly manner without any waste of time. Mr. Blair, after giving a concise presentation of his subject by statements, pertinent to the most salient points of his subject, developed his paper by a series of questions grouped under six captions or divisions. Such an arrangement enables the participants of a convention to express themselves in a few sentences on the points they are most interested and familiar with without rambling all over the subject. The general opinion of the convention on this subject was that both electrically and gasoline driven buses should be operated by tramways companies, but considered only as adjuncts and supplementary means of service. That they are applicable and desirable for short cuts, temporary hours traffic and where laying of tracks is an objection either temporarily or permanently; and that a thorough study should be given to the problem of gasoline driven and the trackless trolley buses.

On the strength of information gathered at many points in the United States and Canada and his personal observations in regard to the efficiency and economy of maintenance of gasoline engines, including a year's study of the subject, Mr. Blair seemed inclined to believe that whenever and wherever the electric street railway companies have to resort to the use of buses, the gasoline driven vehicles will prove preferable from certain points of view. He made it plain, however, that he did not give his opinion as authoritative, due to the comparatively limited material one has, as yet, at one's disposal for a study of this subject, as well as due to the recent adoption of the idea of trackless trolleys on this side of the water.

Discussion

The conditions of street railway industry during the last few years brought about a situation where any method that will offer an operating solution for certain conditions where traffic is not dense, is looked upon with great interest. The trackless trolley in Europe has been in service for some ten or fifteen years, operating under various conditions and with various types of overhead and collection equipment. Practically all the trackless trolley lines on the continent are operating with a variety of current collection equipment ranging from that of four wheel truck to various combinations of slider, both for single and double pole. In England alone the practice was standardized on a two-pole, two-base collection construction. The latter is the only type that has been able to operate over a wide range of roadway and at sufficient speed to maintain an economic schedule. The same system is in operation in running the buses in Shanghai, China, the equipment being installed by an English concern.

Past Practice the Basis of Bus Construction

Mr. Manz in leading the discussion, covered very thoroughly the overhead construction, supplementing his remarks by very interesting and instructive slides of trackless trolleys in operation and many diagrams of overhead construction. Past practice was the basis of bus construction and motor management. The absence of grounded return and the necessity for providing a positive and negative feeder within a short distance of one another make the problem of current collection at first seem rather difficult, until a careful analysis of the fundamental conditions are made.

However, it is necessary, and it is quite possible and practical, to lay out the overhead with standard overhead materials and secure the positive operation necessary.

W. R. Robertson, general superintendent of the Railway Department of the Hydro-electric Power Commission of Ontario, gave a most interesting account of the study made by him, and material gathered for it, in connection with the trackless trolley put into operation in Windsor, Ont., about a month ago.

He was emphatic in his contention that electric street railways companies should encourage proper development of trackless trolleys, where the motive power of the buses is electric current as against the use of gasoline engine. Following a very careful analysis of both means of bus locomotion he was ready to believe that electrically operated buses are, for many reasons, more desirable and economical than their competitor—the gasoline bus.

Operation of Trolley Buses in Windsor

The reason for installing trolley buses in Windsor was the realization of the fact that certain districts were not properly served with transportation facilities. The use of trolley buses was decided upon to take care of this service until such time as the density of traffic warranted the construction of rail lines. In making the traffic survey of the district now served by the trolley bus it was found that one district has a population of approximately 4,700 people residing within 500 feet of the then-proposed and now-in-operation line; the other two districts had a considerably larger number of inhabitants, varying from 6 to 11 thousand, but yet not sufficient to justify the expense of a permanent tram line.

The line now in operation is between one and a half and one and three quarter miles in length. In determining the type of bus that would be used both the gasoline and the electrically driven bus type were very seriously considered. From the best information that could be secured the finding was that the economical life of an internal combustion engine, such as used on the gasoline trucks is 125,000 miles. With the electric motor the average yearly car-mileage in street car service is 35 to 50,000 miles, and the life and economy of operation appear to be governed entirely by the the obsolesence of the type, as a motor even after operating 20 years with ordinary maintenance is often in as good condition as when first put into operation.

With respect to the cost of operation; from the best information that could be gathered, gasoline when used as fuel costs in the neighborhood of from 5 to 7 cents per bus mile. The power consumption on the type of bus adopted in Windsor is about one kw.h. per bus mile. Another consideration is that electric street railway companies have as employees men experienced to handle electrical repairs economically without having to provide any further facilities.

The overhead construction essentials are simplicity, safety, lightness, with a maximum strength for a minimum weight; the collector must be flexible enough to take care of wire variations, and compensate for the swaying of the bus on account of poor roadway surface. The bus must be able to diverge, running at normal speeds, to permit the passing of other vehicles on the street; it also must operate to the curb line in each case to pick up and discharge passengers.

The buses in Windsor have a running speed of 25 miles per hour on level roadway, with about 450 volts. In order to make a complete turn a bus requires a radius of approximately 31 feet.

Since the inauguration in Windsor of the trolley buses on Lincoln Road, on a 15 minute headway, not a trip has been lost. There have been no dewirements of the trolley poles; loops are provided at each end of the line, so as to prevent any delay in wyeing. The public, the operators and the management are very well pleased with the new system, the operation being practically noiseless, which makes them so much more desirable for operation on the streets of residential districts.

Jitneys Cut into Revenue

Mr. Palmer of Baltimore, in contributing to the discussion, stated that his company found itself confronted with the jitneys and other "Free-Lancers" in the transportation business taking away from them of from $300 to $500 per day of revenue, which made it necessary to give a supplementary service by means of buses. He mentioned that the engines used on gasoline buses are of the truck type, which are neither economical nor speedy enough to be satisfactory, but that there is being now developed a special type of gasoline engine for passenger buses, which may make that kind of bus more desirable than a trackless trolley.

A feature of the convention was the large number of splendid and educative films shown.

The officers elected for the coming year are as follows: hon. president, E. A. Robert, president Montreal Tramways Co.; hon. vice-president, W. C. Hawkins, president Dominion Power & Transmission Co., Hamilton; hon. council, Col. J. E. Hutcheson, Montreal; T. Ahearn, Ottawa; Geo. Kidd, Vancouver; Acton Burrows, Toronto. President, Maj. F. D. Burpee, general manager Ottawa Electric Railway Co.; vice-president, H. H. Couzens, general manager Toronto Transportation Commission. Executive: A. P. Coleman, Hamilton; C. L. Wilson, Toronto; A. W. McLimont, Winnipeg; R. M. Reade, Quebec; W. L. Weston, Toronto; D. W. Houston, Regina; A. Eastman, Kingsville, Ont.; H. E. Weyman, Levis, Que.; W. R. Robertson, Toronto. The hon. treasurer is T. Hart, Three Rivers, Que.; Auditor, Col. Geo. C. Royce, Toronto

Appointed Selling Agent

The Ward Leonard Electric Company, of Mount Vernon, manufacturers of Vitrohm Ribohm resistors and electrical control appartus, announce the appointment of Joseph E. Perkins, 113 East Franklin Street, Baltimore, Md., as their selling agent for Maryland, Virginia and that part of Pennsylvania identified as the Susquehanna Valley, as far north as Harrisburg.

Electric Resistance Welded Rail Joints

A paper read before the Canadian Electric Railway Association Convention

By E. B. ENTWISLE*

Electric Resistance Welded Rail Joints

When girder rails were first introduced to the electric street railway industry in the United States in 1884 there was also introduced the problem of joints, as this question had been treated in an altogether different manner in the use of the flat, or "stringer" rail joint in the early years of street railways.

It required a dozen years of use of the girder rail to prove that its life depended not so much upon the chemical proportions of the steel or the quality of its supporting ballast, as it did upon the character of the joints. Rails were removed from the track, not because the rail as a whole had reached the limit of wear, but on account of the failure of the joints, and the measure of value of the rail was cut down in a rapidly increasing ratio the longer the defective joint remained in the track.

We all remember the lighter rail of 30 to 60 pounds per yard in the early days of the electric traction, as compared with the larger rail, heavier splice bars and heat-treated bolts of the standard construction of to-day, made necessary by the heavier cars and equipment. The evil of the joint still remains, although great improvements have been made in the various types of bolted, cast-weld and electrically welded joints.

The type of joint this paper has to deal with is the electric resistance joint of The Lorain Steel Company, the successors of The Johnson Company of Pennsylvania.

This form of welding first took place about 1894 and was designed to unite two rails with a bar 7 inches long on each side of the web, with contact against the web at the extremities of the bar. The current was passed through these contacts and welded them to the web. The first of this type of welding was done in Boston on what was known as the Providence Rail, the joint then in use being a casting which received the foot of the rail, with a wedge driven along one side to hold rail and casting together. Later and more successful designs of electrically welded splice bars replaced the first type, and with few alterations have been the standard for twenty-five years.

To go back for a moment into the history of continuous track. It was not without much time, labor and expense that the fact was demonstrated that 7 inch or 9 inch girder rail laid in paving in long stretches of 1,000 feet or over, would remain in the paving under the extremes of heat and cold. An allowance for expansion had always heretofore been provided. In order to determine this question a stretch of 6 inch rail, 1,000 feet long, laid in macadam and operated over by the Johnstown Traction Company, was united at each joint by two bars 1¾ inches thick, 2½ inches wide and 5 feet long; with 18 turned bolts of 1¼ inch diameter. Examinations for expansion or contraction in the extremes of heat and cold were daily made, covering over six months of time. None being found upon the most careful measurements, the welding of rails with the ends abutting was begun, and continues to be successfully prosecuted.

The bar-welding with head support, if done on new rail with no splice bar holes, is 18 to 22 inches long, 3¼ inches wide, 1⅛ inch thick, of mild steel. If on old rail the bars are long enough to extend beyond the old bar holes. To prepare the bars for welding they are heated and placed under a drop-hammer which forces a pear-shaped portion of the metal above the surface of the bar at each end, and a strip 1¼ inch wide across the bar in the middle. These three areas are the sections welded. A head-support about 4 inches wide is welded to the bars at the time the middle weld is made. This is also welded to the side of the rail head, and to the web. The equipment consists of a sand-blast outfit to clean the ends of the rails; a car to carry the current generator and air compressor, and a car equipped with grinding apparatus. The process, after the rails to be welded are brought to line and surface and the heads are abutting, is to hold the bars against the rail web with two powerful clamps, send the electric current through the contacts and fuse the bars and the rail together. The centre weld is first made, then the end welds. After the weld is made and the current turned off, the side pressure against the weld is maintained until the critical temperature is passed. This pressure is equal to about 45 tons on an area of slightly less than four square inches. This form of electric welded joint has probably reclaimed more track and brought it to its greatest use, than any other form of joint in use. It comes nearer to eliminating the joint than other types, as the rail heads are brought tightly together by the contraction of the bars and when failures occur the rail breaks in the web beyond the weld, and this is accounted for sometimes by the contraction of the rail behind the weld, the accumulating force of the contraction of a long rail centralizing at the break.

For twenty-five years this process has been carried on until now there have been welded over 800,000 joints distributed among the principal cities of the United States, and many repeat orders testify to the estimation of its value held by those who know it best. A repeat order for the 15th consecutive year of one of the largest traction companies has just been entered.

The process has been successfully applied to open tee rail construction on the Elevated Railway of the Myrtle Avenue line, Brooklyn. Here the track is exposed to rapid changes in temperature of the air, without the aid of the earth to absorb and dissipate the accumulated heat. An experimental installation of 370 joints was made in December, 1914, January, 1915, and a recent inspection of this track reveals that four joints have been removed on account of breakage through the rail, one other showing fracture through the welded bar, and eight other joints slightly defective due apparently to not filling up the openings between rails with shims when the weld was made. This installation after 7½ years of service is still carying traffic with a minimum cost as to joints. No other type of joint ever used on the elevated railway can show a record comparable with this, and there is on no other elevated structure a more nearly noiseless track than this stretch of welded track.

In welding old track it is especially important to close open-joints with shims prior to welding. In new track it is equally important, and it is the fact that to drive the rails together as close as you may, the shrinkage of the bars after the last weld will draw the rails together still tighter. All welded joints of whatever character are subject to the strains of expansion and contraction, and all track is subject to vibration under moving load. Under heat stresses we get expansion, and with cold comes tension, and accelerated vibration due to the increase in tension. A joint to withstand these conditions must be as strong in tension as the rail itself. Breakages in this form of joint have been in the rail and not in the bars.

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*Chief Engineer Lorain Steel Co.

Failures

Joint failures can be accounted for on the hypothesis of power shortage during the moment of welding, on overheating, on imperfect alignment and surfacing of the rail prior to welding, and on contraction of the rail localizing at the joint. A few percentages of failures will serve to give an idea of the worth of this form of joint simply as a maintenance proposition. An installation of 1943 joints in 1917-18 on 7 inch new girder rails, had 5 breaks. A later installation of 3833 in '19-'20-'21 has no breaks to date. This is a 1-10 of one per cent. record.

Six miles of 56-lb. tee rail track laid in macadam with one rail uncovered to the ties, was welded ten years ago, and an inspection this month reveals no broken joints.

Another large installation covering about 17 years, for the Public Service Corporation of New Jersey, required 130,158 joints. There has been welded in Chicago since 1907 a total of 184,423 joints on the standard Chicago rail, which weighs 129 pounds per yard and is 9 inches high. Of these the percentage of breaks during the first six years was 2.74, and the average for nine years was reduced to below 1.5 per cent. This improvement, to quote from the report of the Board of Supervising Engineers, Chicago Traction, was brought about "by the combined efforts in improving the workmanship of the weld and by the more uniform conditions of power supply which became available as the work proceeded."

Butt Weld

The Lorain Company is now operating under the Jacob's patents on a butt weld. This process contemplates bringing the milled ends of the rails together and welding them without the aid of bars. This was the process aimed at by the predecessors of the Company back in '93-'94, but their engineers were unsuccessful in achieving what apparently today is the 100 per cent. joint.

The butt-weld process consists essentially in a method of heating the end, or abutting surfaces of the rails to be joined, by having them in contact with a liquid flux which is heated to a high degree by the passage of a comparatively small electric current through it, and a powerful clamp against the rails, operated by a hydraulic pump, for forcing the rails together, end to end, after the ends have been brought to a welding heat. The apparatus is mounted on two trolley cars, the first of which contains a 30 kw. motor-driven alternating current generator, an air compressor, and a furnace for melting the flux, and a re-heating torch. A switch-board with all necessary meters and regulating apparatus is also provided.

In the process the rails are spiked to a few ties to hold them to gauge and to insure a fair surface and alignment, and an opening of about ½ inch between the ends. The rail clamp and cross-head are then adjusted so as to automatically bring the two rails in line with each other. A spacer is set between the rail ends and a preliminary pressure of 5,000 pounds per square inch is applied before the molds are set in place. When the molds are set the cable terminals from the generator are clamped to the cross-heads and the current is passed through the flux, which has been previously melted and poured into the mold. The current in its passage through the flux heats the ends of the rails to a high degree above the welding heat of steel, and when this point is reached, which requires about 3½ minutes, the pressure is applied, the rails are forced together and simultaneously the current is cut off. At about a half minute before a welding heat is reached, the current reaches its maximum when about 1,650 amperes are taken at about 40 volts. No oxidation in the weld is possible, as the rail ends are completely immersed in the flux and no air can reach them.

Immediately upon applying the full pressure the top mold is taken off and the hot metal which has extruded at the weld is hammered across the head, thus producing a forging effect to obviate any tendency that might exist to soften the rail at the exact point of weld.

Sceleroscope tests show that the portion which has been heated and hammered is actually somewhat denser than the parts of the rail that have not been heated. The pressure holding the rails together is held until the weld has cooled below its critical temperature, when the re-heating torches are applied and the flame directed to the centre of the web, directly against the weld, and it is re-heated to about 1,500 deg. Fahr. This relieves any strains that may have been set up due to the end pressure or other causes.

About 5/8ths of an inch of each rail is combined in the weld, the extruded metal being ground off the head and tram. As a continuous operation about three welds an hour can be made on 9 inch rail.

The first experimental butt welds were made in Pittsburgh, Pa., in December, 1919, and in Johnstown in the summer of 1921, on the tracks of the Johnstown Traction Company. Ninety-three welds on 134-lb. 9 inch girder rail were made, making two rails each 2,700 feet long. About one-half of this track was sprung into a curve and was not paved in for several weeks. Yet there was no distortion under constant operation, and no breaks to date.

In Boston, 504 welds were made in 1921 on four different rail sections. In Philadelphia 402 welds on 9 inch, 141 pound rail were made within the last year. In this process, due to the single track operation in that city, the welding apparatus was set on a motor truck, the rails being laid on top of the paving outside of the track, which was being operated over by the railway company. Sections from 1,000 to 1,500 ft. long were welded, and were afterward set over into the track in their permanent position. The advantage of the process is due to the fact that the entire cross-section of the rail is welded, without the addition of any other metal. While special conditions require special treatment, there are no difficulties which cannot be surmounted, and they are more than compensated for by the permanency of the result. There has been but one failure in over 500 joints welded in Boston, and five joints in over 400 welded in Philadelphia, and none in Johnstown where 93 joints were welded, a total of 999 with six failures.

The Board of Commissioners of Public Utilities of the Province of Nova Scotia is at present engaged on the valuation of the property of the Nova Scotia Tramways and Power Co. Limited. The company will have the option, on the completion of the valuation, to make application to the board for approval of such rate schedules as will yield a net return of 8 per cent. on the value of the investment in the various departments, as found by the Board.

Coming Conventions

Canadian Electrical Association, at the Chateau Laurier, Ottawa, June 15-16-17.

Association of Municipal Electrical Utilities, at the Clifton Hotel, Niagara Falls, Ont., June 22-23-24.

American Institute of Electrical Engineers, at the Clifton Hotel, Niagara Falls, Ont., June 26 to 30.

Current News and Notes

Annapolis Royal, N. S.

Mr. S. Rippey, Annapolis Royal, N. S., has been awarded the electrical contract on a town hall being erected at that place.

Boissevain, Man.

Mr. N. Johnson, who has been superintendent of the electric light plant of the Melita Milling Co., Melita, Man., has received the appointment of superintendent of the municipal electric light plant for the town of Boissevain, Man.

Fort William, Ont.

During the year 1921, in the city of Fort William, it is estimated that about 190 electric ranges were installed. Electric water heaters, to the number of about 190, were also installed during that period.

Guelph, Ont.

Mr. W. Stuart, Quebec St., London, Ont., has been awarded the contract for electrical work on two stores to be erected on Quebec St., London, for Mr. F. Kloepfer, of London.

Hamilton, Ont.

The Electric Supply Co., Ltd., 65 St. James St. South, Hamilton, Ont., has been awarded the electrical contract on 14 stores, apartments and theatre to be erected near King St. E. & Main St., Hamilton, at an estimated cost of $300,000, by Deta Properties, Ltd., Hamilton. Also the electrical contract on a $25,000 bank building to be erected at King & Main Sts., Hamilton, by the Bank of Hamilton.

The Salisbury Electric Co., 112 King St. W., Toronto, has secured the electrical contract on a building at 55-59 King St. E., Hamilton, that is to be remodelled at an estimated cost of around $120,000.

Mr. J. Dynes, Prospect St., Hamilton, Ont., has secured the contract for electrical work on five stores being erected at King and Spadina Ave., Hamilton, for Messrs. McKay Bros., of that city.

Kitchener, Ont.

The Star Electric Co., Kitchener, Ont., has secured the electrical contract on six residences being erected at Albert & Filbert Sts. and Hohner Ave., Kitchener, by Messrs. Schmalz & Peterson.

London, Ont.

Mr. J. H. Pollock, 397 Clarence St., London, Ont., has been awarded the contract for electrical work on a building on Queens Avenue, London, owned by Dr. Geo. McNeill, that is being remodelled for offices.

Montreal, Que.

Messrs. A. A. Giddings & Co. Ltd., 660 Dorchester St. W., Montreal, have been awarded the contract for transformers for the $8,000,000 hotel being erected by the Mount Royal Hotel Company at Peel & St. Catherine Sts., Montreal.

Mr. W. Rochon, 454 Lafontaine Park, Montreal, has been awarded the contract for electrical work on a $60,000 apartment house being erected at Roy & Alfred Sts., Montreal, by F. X. Bissonette, 341 Drolet St.

Oakville, Man.

The Oakville Electric Co. Ltd., has been formed, with a capitalization of $20,000, to carry on an electrical contractor-dealer business, etc., in the town of Oakville, Man.

Ottawa, Ont.

Mr. E. G. Tressider, 5th Avenue, Ottawa, has been awarded the contract for electrical work on a store building being erected on Bank St. South, Ottawa, by Mr. Ainslie Green, Hope Chambers, Ottawa.

The Canada Gazette announces the incorporation of the Radio Sales Co. Ltd., with a capitalization of $75,000. Head office, Montreal.

The Success Electric Products Company, Ltd. has recently been formed, with a capitalization of $50,000. Head office, Ottawa, Ont.

Port Arthur, Ont.

About 105 electric ranges, and about the same number of electric heaters, were installed in Port Arthur homes during the year 1921.

The first of the rebuilt one-man cars for use in Port Arthur, Ont., was recently given a try-out on the streets of that city, with entirely satisfactory results.

Port Colborne, Ont.

Messrs. Sherk & Kennedy, Port Colborne, Ont., have secured the electrical contract on a $34,000 school to be erected at Humberstone, Ont., in the immediate future.

Quebec City, Que.

Messrs. Goulet & Belander, 190 Richardson St., Quebec City, Que., have secured the electrical contract on St. Sacrement school, to be erected on St. Foye Road, Quebec City, at a cost estimated to be in the neighborhood of $70,000.

St. James, Man.

Messrs. Gamble & Willis, 306 Notre Dame Ave., Winnipeg, have secured the electrical contract on a $96,000 school being erected on Sutherland St., St. James, Man.

The St. James Electric Co., 207 Roseberry Ave., St. James, Man., has been awarded the electrical contract on two stores to be erected on Portage Ave., near Roseberry St., Winnipeg, for Dr. V. M. Leech, 249 Canora St., Winnipeg.

Souris, Man.

Mr. R. Logan, electric and town engineer of the town of Souris, Man., for the last three and a half years, is leaving shortly to start in business for himself. He has purchased the storage battery business of J. Dubick, Souris, and will also do electrical contracting in the district, handling electrical appliances and lighting plants as well.

Toronto, Ont.

Mr. M. Nealon, 9 Glen Morris Ave., Toronto, has secured the contract for electrical work on a $125,000 church and rectory to be erected on Roncesvalles Ave., Toronto, by the Parish of St. Vincent de Paul.

Messrs. Taylor Bros., 25½ Norwood Ave., Toronto, have secured the contract for electrical work on twenty bungalows now being erected on Strathmore Blvd. near Monarch Park Ave., Toronto, by Messrs. Churchill & Morrell, 699 Woodbine Ave.

Mr. A. Mitchell, 1174 Danforth Ave., Toronto, has been awarded the contract for electrical work on 12 pair of residences recently erected at Glebeholme Blvd. & Caithness Ave., Toronto, at an approximate cost of $100,000., by Messrs. Grimshaw Bros., 117 Danforth Ave.

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Canadian Contractors and Dealers Getting Together

Contractor dealers of the Province of Ontario have discussed at considerable length the advisability of holding a convention in the near future, and at the last meeting of the Executive it was decided to take the plunge, and the convention will be held on November 13th and 14th in Toronto.

Though the moving spirit in this matter is the Ontario Association of Electrical Contractors and Dealers, it is hoped that the convention, in fact, will be Dominion wide. It is high time we had the contractors and dealers of the various provinces tied in together in some way, and while it may not be advisable to form a Dominion organization en masse, still a convention composed of contractor-dealers from all over Canada may be the best means of initiating a workable Dominion organization.

The scheme of organization that seems to appeal to the majority and which has more merit, we believe, than any other scheme, is one which would be based on lines similar to those along which the Ontario Association itself is being gradually built up. The scheme in Ontario has been to form local groups covering only such areas as admit of the frequent meeting of the various contractors and dealers in that area. Thus there is a Hamilton district which includes Hamilton and the towns immediately surrounding it. There is a Stratford district, a Windsor district, an Ottawa district, a Niagara district, and so on the idea being to gradually include the whole of the province, each small area having its own local association and being represented on a central provincial executive committee by one or more members. This method of organization is, of course, more laborious and much slower in its formation than a mass association, but it has the merit of being much more permanent and flexible. The fact that one group may be inactive, for a period, does not affect another group, and, indeed, it has proved itself that a small number of groups can function as a provincial organization and carry out most excellent work long before the whole province has become organized at all.

If the various provinces could be brought to the point where they would form or begin to form a provincial executive, built up of representatives of local groups in this same way, we would eventually have a number of provincial executives throughout the Dominion. The next and final step would be a comparatively easy one, viz., to tie in these various provincial executives by the appointment of a Dominion executive composed of one or more representatives from each province.

It is greatly to be hoped that the November convention in Toronto will result in the determination of a final policy for the whole Dominion along some such lines as indicated above. The Toronto convention, as we understand it, will not concern itself to any great degree with the reading of papers or the discussion of technical matters. On the contrary it will be a conference rather than a convention—a meeting together, getting acquainted and discussion of general problems and the best methods of solving them. We urge contractors and dealers of Canada, wherever they may be located, to make a point of being present and take a hand in the presentation and discussion of the many problems that are common to the contracting and merchandising end of the industry. It may mean a little sacrifice in time and money—a temporary sacrifice—but it should mean a very great improvement in the general condition of the industry, a clearing away of much of the debris that is clogging progress at the present time.

The convention will doubtless, have the hearty support of manufactorers, jobbers and central stations, because the progress of the contracting and merchandising end of the industry is a direct measure of the progress of the industry as a whole. Unless the contractor functions properly and unless the electrical merchant functions properly, the industry will continue to stagnate. This convention would appear to offer the greatest opportunity we have ever had of setting the wheels of co-operation in motion in a way that will assure a much more rapid development than we have ever yet experienced.

Canadian Engineering Standards

The sub-committee on rating and testing of electrical machinery held its first meeting in Ottawa on June 16th, Prof. E. G. Burr in the chair. The chairman pointed out that the sub-committee had been formed to consider the advisability of the adoption or formulation by the C. E. S. A. of Canadian standardization rules for electrical machinery, covering the same ground as, and preferably based upon, the rules of the American Institute of Electrical Engineers. As a result of preliminary correspondence, it appeared that practically all the members of the sub-committee were in favor of the adoption of the A. I. E. E. rules, subject to such amendments or changes in arrangement as may be found desirable; this decision was confirmed by the meeting.

Discussion followed as to the best organization for the work, and three Panels were appointed to deal respectively with the rules for rating and testing of:

(1) Large motors, generators, and rotating machinery operating under controllable conditions;
(2) Industrial sizes of motors and generators working under ordinary manufacturing or operating conditions;
(3) Transformers of various types.

The existing transformer sub-committee, would, of course, be consulted as regards the work of Panel No. 3.

Consideration was given to the best method of keeping the sub-committee in touch with U. S. committees working along the same lines, and it was decided that the fullest possible co-operation should be arranged for through the American Engineering Standards Committee.

Emerson Installs Electric Light and Power

On May 9, the rate-payers of Emerson, Man., by a majority of 170 to 25, voted in favor of installing an electric light and power system. This vote ratified an agreement between the Town of Emerson and the Pembina Light and Power Company, Pembina, N. D., covering the supply of electrical energy, and also the expenditure of twelve thousand dollars for the installation of a distribution system.

Power is being purchased at the town's boundary, at the intersection of Main Street and the International boundary, in the form of 3 wire, 3 phase, 2,200 volt, 60 cycle alternating current. It will be supplied continuously during each and every day of the year at the following rates:

For the first 700 kw.h. per month, 10 cents per kw.h.
For the next 1,400 kw.h. per month, 8 cents per kw.h.
For the next 3,000 kw.h. per month, 7 cents per kw.h.

And for all power consumed over 5,100 kw.h. per month, at 6½ cents per kw.h., the town guaranteeing a minimum monthly payment of one hundred dollars.

Power is measured on the secondary side of the step down transformer at the International boundary, the transmission line voltage being 12,000.

The town has signed the agreement for a ten year term and is installing a distribution system which provides for the use of three phase power at 2,200, 550, or 220 volts, and a standard domestic and commercial supply. They are installing a 6.6 ampere, Mazda C, street lighting system of 53 lamps, which covers all of the most densely settled sections of the town. It is expected that power will be turned on for use the first day of September, 1922. The work of the agreements for power, plans, specifications, and installing of the entire system is under the supervision of George L. Guy, 503 Tribune Building, Winnipeg.

Co-Operation

Toronto, June 17, 1922

Editor Electrical News:

At the annual Convention of the Canadian Electrical Association, held this month at Ottawa, and at which the writer was present, the keynote was Co-operation.

It seemed to be acknowledged that something is missing in the industry—each one has been looking after his own cabbage patch—all waiting and wishing for individual success—all willing to pare off something from the other fellow—all talking co-operation and wailing the lack of it—all apparently ready to begin something, yet few daring to attempt.

It is a material fact that all you can get out of anything, is just what you put into it, from Service to Satisfaction.

It does not seem to be a question of individual business organization, nor always a matter of the organization of an association of businesses, but rather a problem of successful handling and dealing with those sections of the trade upon which rests the ultimate success of the individual business or organization.

If we viewed a stage all set, and the players working to their own hindrance, it would be a farce. Yet, isn't that the state of affairs in some industrial and commercial sections, although it passes by the name of Business, or Competition? In actuality it is just a case of grasping the shadow and losing the substance.

To achieve any great success is difficult and undoubtedly distant because the problems are mainly psychological. In other words the problem is a deeply human one.

We nearly all of us are conceited enough to believe that we really know something of human nature. A very little self-examination should reveal that we don't know so much as we think we do, judging by the general mess of matters.

For the same reason we shall not be deterred from trying to study the question a little further with the hope of improvement.

The problem of building a successful business, which embraces satisfaction won in every field, is much too difficult to treat of in a short article. Besides, the writer has not the ability to do it. He can only write as a mere mortal, knowing that something is missing, that something must be fitted into the gap, and do his best to provide further thought for reflection and effort for those who will be able to add their quota of action to secure the success we all desire to get from a co-operative spirit of enterprise.

For this purpose it would seem that we have got to return to, and use, our individualism; because a business or association as such, has no soul and therefore no human element.

It is said that a big business is no larger than the shadow of the man in command. I do not know why a shadow should have been chosen for an analogy. It does not seem fitting. Why not compare the measure of success to the light—something like a big beacon. It would appear much more attractive. Each one can then add his share of light and so make it a torch of progress.

This all concerns the complex machine called man, and we know how impossible it is to analyse the human mind and set it out in simple terms.

It is fully realized that everything except courtesy must cost something. The feeling of co-operation that we are looking for will not hurt the balance-sheet. If the needed endeavours do cost a little, they will surely be profitable; and just as surely, if the efforts are not made, business is going to be profitless. The sole point here being to offer and serve the right kind of effort towards co-operation—that is, something mutually and equally profitable.

Perhaps, Mr. Editor, you could encourage some human letters on this subject, and after analysis, set them out in such a way as to indicate your readers' ideas and aspirations upon a very interesting subject and problem which must have some solution before any real advance is made. No ambitious scheme is needed because it will not work. The journey to Utopia is too far distant for this generation to reach. Any efforts must be modest and sincere. Try to see the other man's point of view, and then let's work together. It can be done.

J. T. Scott,

In our issue of June 15th an item stated that the towns of Winkler and Plum Coulee were purchasing power from the Manitoba Power Co. This should have read "The Manitoba Power Commission."

The Canadian Electrical Association Grows in Vigor with the Industry Itself

Recent Convention in Ottawa Shows Increased Membership and Unremitting Enthusiasm and Activity—Merchandising Receiving more Attention—Valuable Reports and Discussions

The annual convention of the Canadian Electrical Association,—the 32nd—held in the Chateau Laurier, Ottawa, during the days of June 15-16-17, was an unqualified success. Registration was unusually large, and the reports presented by the various committee were full of interest.

Mr. Julian C. Smith, president of the association, occupied the chair during most of the sessions, the business of which consisted largely in the reading and discussion of reports on a number of phases of the electrical industry. The president, in his opening address, briefly summed up the progress of the association during the past year, pointing out the amount of valuable work that had been done, by the different committees. This was followed by the presentation of the treasurer's and secretary's reports, both of which proved highly satisfactory. In this connection Mr. Vinet, the secretary-treasurer, announced the fact that this would be his last year in office, a statement that was received by the members with the keenest regret, realizing as they did, that the successful work of the association during the recent past, has been due in no small measure to Mr. Vinet's capable and assiduous application to the secretarial work.

Thursday morning's further business consisted of reports by J. B. Woodyatt for the Public Relations Section and M. K. Pike for the Membership Committee.

In the afternoon Louis Pratt led off with his report for the Commercial Section.

This report brought out a considerable amount of discussion, particularly covering the need of some form of standardization in the making of contracts and the standardizing of the peak period on which power should be measured. Messrs. Beaumont, Woodyatt, Smith, O'Brien, Doddridge, Barnes and Dion favored a uniform power contract. Mr. Dion also spoke at some length on the necessity for merchandising being carried on with profit by the central stations; propaganda work, too, for better illumination, he thought, must be done by the central station companies. He approves the standard contract for the added reason that it simplified explanations to the public. Mr. Smith spoke of the need and increased use of synchronous equipment for power-factor correction. The Shawinigan company require their customers to maintain an 85 per cent. power-factor. Mr. Woodyatt remarked on the advisibility of penalizing a low power-factor. Mr. Pratt explained that his company penalize below 70 per cent. and pay a small bonus above that amount. The probability of static power-factor correction equipment being placed on the market in the near future was mentioned.

Power Sales Report

Mr. P. R. Labelle, of the Shawinigan Water & Power Company, read the report of the Power Sales Committee, in part as follows:

During the current year this Bureau thought it advisable to try and standardize power contracts for general use throughout the country, and after obtaining copies of power contracts from various member companies, it was considered advisable, owing to different conditions in the different sections of the country, not to attempt to draw up a standard form of power contract but this Bureau desires to draw the attention of member companies, in particular of smaller companies, to the necessity of providing in their contract for the following:—

1st—Power-factor clause.—The larger companies already

The Canadian Electrical Association's Officers for 1922-23

R. J. Beaumont, 1st. Vice-Pres.

P. T. Davies, President-Elect

A. P. Doddridge, 2nd. Vice-Pres.

provide against loads with poor power-factor realizing the importance of this, but the smaller companies, we find, are overlooking this all-important matter.

2nd—All power contracts should have a minimum guaranteed monthly payment to provide against loss of revenue during shut-down. During the past few years a number of member companies have suffered considerably having no provision in their contract to protect themselves against this loss of revenue, this particularly applies to smaller companies.

All contracts should have a clause stating that the maintenance of voltage and frequency at the point of delivery shall constitute delivery or service.

3rd.—A definition should be made on all power contracts of the basis for the measurement of the power contracted for. A reasonable basis for fair sized loads seems to be a 10 to 15 minute average maximum load; smaller loads can well be taken care of by basing a rate on the size of the motor as designated by the name plate.

In discussing power prices and conditions with prospective customers, reference is frequently made to conditions offered by competitive companies, and it would seem that if all companies adopted a standard basis of measurement it would be to the benefit of all.

During the current year, this Bureau circularized all the member companies drawing their attention to the Electrical Heating courses given by the N.E.L.A. These courses have been given both at the works of the Westinghouse Company and the General Electric Company, and from information received from those who have taken these courses, and from personal knowledge of the Chairman of your Bureau, who had the privilege of taking this course, central stations are strongly recommended to send representatives to attend these courses as they are certainly the means of putting one in touch with the various applications of electrical heating and give one a proper view of the possibilities for this class of business. We believe it is the intention of the N.E.L.A. to make arrangements to continue these courses throughout the year.

This question of Industrial Heating is a very important one to all distribution companies, as being an excellent means of providing additional load. It would seem, however, that before recommending the application of electricity for heating purposes, a very close survey of conditions be made so as not to saddle the customer with apparatus which would not be economical, and thereby avoid dissatisfaction and the condemnation of electrical apparatus for this purpose.

Considerable publicity has been given to electric furnaces for the melting of brass and other metals, but it would seem from the experience of several companies that before recommending apparatus of this kind, serious consideration should be given to the matter, as unless these furnaces can be used at a fairly high load-factor, instead of being a benefit to the customer, they become a burden, owing to the minimum payments which are always provided for in contracts of this kind.

Electric Ranges and Appliances

The electric range load and bake oven load is one that is well worthy of being developed and, owing to the diversity factor of these loads, is productive of a very good revenue to the companies. Serious effort should be made to promote the use of various appliances in the home.

A careful study and survey made by a company in Philadelphia on some 1,300 houses using various apparatus shows that 51 1/10% of the total energy consumed was used from 7 a.m. to 7 p.m., showing that this was entirely used by household appliances, and 49 1/10% was consumed from 7 p.m. to 7 a.m., showing distinctly that the appliance load is equal to the lighting load. This study was made in the summer months, at which time the lighting load does not cross the load or energy used by appliances. This survey was carried on for one whole week, and certainly shows up very plainly the importance of the use of appliances as a revenue producer.

Merchandising

The report on Merchandising by Mr. G. R. Atchison, of the Southern Canada Power Company, was one of the most interesting, as it was also one of the most valuable reports presented at the convention. Mr. Atchison's report is printed on page 45.

The discussion following the reading of this report was keen. Mr. Smith again reiterated the opinion that if member companies enter the merchandising field they must operate this part of their business on just as sound a basis as they do the manufacture or sale of power. Mr. Pike ventured the opinion that the members of the Canadian Electrical Association, being absorbed more or less in engineering matters, were not giving to the subject of merchandising as much attention as its importance deserves. Mr. O'Brien urged the necessity of advertising consistently. Mr. Dion raised the question of the advisability of selling electric ranges on time payments, and received the answer from a number of members that this scheme had been found to work out very satisfactorily. Mr. Reid remarked on the poor equipment of electrical stores; the slovenly appearance of the attendants; the unattractive windows. Messrs. Pratt, Lane and McIntyre also contributed to the discussion.

Report of Industrial Lighting

Following the reading of the report on Industrial Lighting, prepared by Mr. J. H. O'Hara, chairman of that Committee, (reproduced on page 36), an illustrated talk was given by Samuel R. Hibben. Mr. Hibben's remarks were in the nature of an elementary talk, but his illustrations were exceedingly well chosen to illustrate his points. A talk of this nature to electrical contractors and electrical merchants, whose business it is to treat of these matters directly, would be of the greatest assistance. Mr. Hibben made two or three useful suggestions regarding attractive window displays. For instance, a bouquet of white peonies were shown under lights of various colors. If this effect could be produced by an automatic flashing arrangement it would undoubtedly attract a number of passersby and impress them with the wonderful possibilities of color illumination. Mr. Hibben also spoke of an industrial lighting exhibit prepared by his company and shown at many points in the United States. It was a portable building, about 20 ft. by 30 ft., representing a factory and the wiring was so arranged that the various forms of lighting—good, bad and indifferent—could be shown in comparison. The opinion was expressed by many of the members present that permanent model installations of illumination, within reach of the general public, would be a valuable form of propaganda.

Friday Morning June 16th.

A number of interesting reports were read as follows:—Report of Technical Section, R. J. Beaumont; Report of Meter Committee, E. Holder; Report of Electrical Apparatus Committee, J. S. Wurtele; Report of Underground Systems Committee, L. A. Kenyon; Report of Overhead Systems Committee, A. P. Doddridge; Report of Inductive Interference Committee, J. H. Trimingham; Report of Lamp Committee, Watson Kintner.

Mr. Pratt opened the discussion following the reading of Mr. Holder's report for the Meter Committee. He spoke of the very rare cases where the meters in his own company had been found more than 3% fast—only two cases within recent years. Mr. Pratt showed some interesting photographs and charts; the photographs showed a meter installation in a Hamilton home where the meter had been so placed that it was readily read by the meter reader from the outside of the house, thus avoiding the troublesome annoyance of tracking into the home and interfering with domestic arrangements in general. The curves were designed to show the difficulty of fixing a standard time period of maximum demand. One of the curves was that of a rolling mill where the instantaneous demand was very great and the duration of the load very brief. The curve with which this was compared indicated a gradually changing load. If the basis of charge for these two customers were the same, it would manifestly be unfair to the central station.

Mr. Gregory emphasized the point that the correct method of charging must be based upon the capacity of the equipment that is tied up in taking care of any particular load. Mr. Smith urged the necessity of stating definitely in every contract the exact method that would be used in measuring the customer's load. Mr. Woodyatt stressed the same point, suggesting that the period seemed of less importance than the necessity of having a very definite understanding with the customer. Contributions to the discussion were also offered by Messrs. Reid, Baker, Ross, Cam, Labelle, Henderson and Higman.

Mr. Wurtele's report for the Electrical Apparatus Committee also introduced a valuable discussion particularly as regards the rating of motors. Different manufacturers rate their equipment differently and the customer naturally does not understand that a certain higher rating of one manufacturer may not mean any more capacity than the lower rating of another manufacturer. The opinion was freely expressed that if manufacturers could not agree on a standard rating, there should, at least, be a basic rating and a definite ratio between that and the motors of all manufacturers. A motion to this effect was introduced by Mr. Gregory and carried unanimously, which will be brought to the attention of the Canadian Engineering Standards Association, with a request for action on their part. Messrs. Davies, Dion, Dwight, Smith, Maclachlan, Barnes, Pratt, Anderson, Cooper and Mudge contributed to the discussion.

Mr. Kenyon's report on Underground Systems and Mr. Doddridge's report on Overhead Systems were considered together. Mr. Winter, of the Bell Telephone Co., spoke of the possibilities in the joint use of poles. In a number of cases this has been tried out and proven satisfactory, not only from an economic viewpoint but it had the advantage that the landscape was interfered with just so much less.

In the afternoon the report of the Accounting Section was presented by Col. D. R. Street, who urged the necessity for a nearer approach to standardization and closer attention to the accounting side of the business, particularly in smaller companies. Col. Street was followed by Mr. Paxton Little of Niagara Falls, who spoke of his experiences along the same line.

The accident prevention report was presented by Mr. Wills Maclachlan and spoken to by Chas. B. Scott, manager of the Bureau of Safety at Chicago. Mr. Scott has had an unusually wide experience in safety work and has studied it from both the economic and the humanitarian side. He laid down certain rules which he considers absolutely essential if safety work among employees is to be a success. These are as follows:—1. the backing of the management; 2. an organized scheme of education and operation of safety principles; 3: obedience to rules. Mr. Dion moved a hearty vote of thanks.

Social Functions

Luncheon on Thursday brought all the delegates together for the first time. The speaker was Mr. A. Monro Grier. Mr. Grier was at his best and delighted the members guests and ladies president by a glowing word picture of the aims and the destinies of the electrical industry, of which the Canadian Electrical Association formed such an important part. Taking "Loyalty" as his topic, he urged the support of every member to the end that the Association may perform efficiently and effectively that part in developing the industry for which it was specially adapted and constituted. In closing, he spoke of the pleasure the Canadian Electrical Association always experienced in having a number of prominent guests from across the line, and expressed the hope that the interchange of ideas between some of the best minds in the industry, would result in profit to everybody present.

The luncheon on Friday was held in collaboration with the Kiwanis Club. Mr. Howard Murray, M. P., of Montreal, was the speaker. Mr. Murray's theme dealt chiefly with the wonderful waterpower resources of the province of Quebec and the industrial developments that had followed the development of these waterpowers. He explained how these waters were being utilized to the fullest extent by the construction of storage dams and drew a glowing picture of the future industrial development of the province. Ample waterpower, an industrious people, an engineering profession highly endowed with ability and industrial leaders possessing capital, courage and foresight, all foretold a future of uninterrupted activity, development and prosperity.

The climax in the entertainment features was reached on Friday evening when all the delegates, guests and ladies met for dinner at "Holmstead Inn", across the river on the Quebec side. Mr. Smith again presided and a number of address followed. W. H. Whonken representing the president of the National Electric Light Association, read a message from that Association to the C.E.A. Lawrence W. Davis, special representative of the National Electrical Contractor-Dealers' Association, spoke of the work of his association and the urgent necessity of developing an electrical merchandising class of men so that the products of electrical manufacturers may be passed along economically and quickly to the general public. Mr. Lane, a special representative of a group of electrical organizations, of which the N.E.L.A. is the moving spirit, and whose endeavors at the moment are particularly directed to the development of better business conditions in the electrical industry, also spoke briefly. Mr. George D. Leacock, the last speaker proved a fitting link between the heavier part of the entertainment, which had gone before, and the lighter part which was to follow. Mr. Leacock delighted his audience with some, timely stories and a few typical original comments on things in general as he saw them, after which the gathering adjourned to the dancing rooms below.

Officers and Advisory Committee

President: P. T. Davies, Southern Canada Power Comp., Montreal.

1st. vice-president: R. J. Beaumont, Shawinigan Water & Power Company, Montreal

2nd. vice-president: A. P. Doddridge, Quebec Railway, Light, Heat & Power Company, Quebec City, Que..

3rd. vice-president: L. W. Pratt, Hamilton Cataract Light & Traction Company, Hamilton, Ont.

Secretary-Treasurer: To be appointed.

Executive Committee

The Officers and: Chas. T. Barnes, Toronto,& Niagara Power Co.; N. S. Braden, Canadian Westinghouse Co.; W. A. Bucke, Canadian General Electric Co.; A. B. Cooper, Ferranti Electric Co.; A. A. Dion, Ottawa Electric Co.; A. Monro Grier, K.C., Canadian Niagara Power Co.; J. S. Norris, Montreal Light, Heat and Power Co.; M. K. Pike, Northern Electric Co.; J. C. Smith, Shawinigan Water Power Co.; W. L. Weston, Nova Scotia Tram. & Power Co.; W. H. Winter, Bell Telephone Co.; J. B. Woodyatt, Southern Canada Power Co.; The president, National Electric Light Association, New York.

Address of President Julian C. Smith to the Delegates at the Canadian Electrical Association Convention

In addressing you this morning for a short time, I am sure our guests will pardon me if I make a few comments and suggestions about our own Association, its needs and policy.

To be of value any organization must be powerful in its own field. Power indicates strength, and so the Canadian Electrical Association must continue to increase its membership, and thereby gain in influence and also in financial ability to carry out whatever policy may be decided on. We do not want a tea party, we want an association clear headed in its ideas, and strong enough to go out and demand, if need be, those things which will benefit not only our association, but also the whole people of Canada. The individual growth of a nation may now be measured by the per capita use of power. Canada, like all the highly civilized countries, is rapidly changing from an agricultural state to an industrial state. This change can only go on with power used on an ever increasing scale; so our own industry, which is fundamentally based on the use of power, must use all proper methods to encourage and direct the development of the use of power in Canada.

I think the time has arrived when this association should adopt the principle of a permanently paid executive-secretary and I ask your consideration of this important matter.

We should change our by-laws so that the position of secretary-manager is created, and the post should carry compensation enough to justify the efforts we want.

When I assumed the office of president of this association a year ago—an honour, gentlemen which I assure you I deeply appreciate—I determined that if possible I would continue the very able work so well carried on by my predecessor in office, and also try to carry out certain policies which I thought were of great importance.

Increase in Membership

The increase of membership has had the earnest consideration of our executive committee. A special committee was appointed to deal with this matter and the result was that our total membership was increased by 176, an increase of 56 per cent. There are still a few important public companies who are not members of our association. We need these companies, we want the help and advice of the executives who head them, and we believe that the C.E.A. gives in return benefits which more than compensate for the time and money involved.

We have developed another innovation this year. The large executive committee proved too large and difficult to get together frequently. We created a small committee which met on several occasions and which assisted materially in the transaction of the business of the association.

Our special committee have worked hard, and the reports you will receive at this convention bear witness to the fact that the committee members and the chairman have given liberally of time and ability for the good of the association.

We have kept in constant touch with the N.E.L.A.

Personally, I have been unable to attend many meetings and discussions to which I have been asked, but I have sent our secretary to all important ones, and his reports are very interesting and valuable. I am sure, too, that he was able to give something also to the meetings which he attended, as well as receive a great deal.

We started a circular letter to the Members with the thought that more interest and co-operation in the C.E.A. would result. Judging by the many letters received the plan was successful, and the next president may find the scheme well worth carrying on, possibly on a broader scale.

An important step was taken during the year by the incorporation of the association by Letters Patent of the Dominion of Canada. Previously, we had no legal status and strictly speaking had no right to function, collect money, own property or do any of the things which we have been doing for many years. We now have a charter, and at this convention the change will be made of taking all the old members into the new incorporated C. E. A.

The new by-laws are practically the same as the old; so far as the members are concerned the whole affair is only a formality which must be gone through with, to insure the C.E.A. a position from which it can go on in the future.

Finances in Good Shape

The finances of the C.E.A. are good. You will hear the report of the secretary-treasurer and will note that we have a balance left, after paying all our expenses.

In connection with the finance, we have deemed it wise to appoint a firm of chartered accountants as auditors of the C.E.A. The auditor's report is attached to the general statement.

Before closing his part of my report, I wish to express my appreciation of the co-operation and help which all the members of the C.E.A executive committee have rendered during the year. They have all worked hard and if anything good has been accomplished, it is due principally to the work of each individual member of the executive committee.

It is dangerous to pick out special men to thank, but I am sure that the men on the committee will agree with me that Mr. Dion has been a tower of strength and help to the president throughout the year,, and has always been willing to take on any burden suggested. It is largely due to Mr. Dion that this convention is such a splendid success. Mr. Dion—on behalf of the C.E.A. permit me to express our thanks to you and your colleagues for the great work they have done here.

Water Powers of Canada

To turn to another subject for a few minutes, I wish to speak of certain features of our own industry. A very able Department of the Government—the Water Power Branch—headed by Mr. J. B. Challies, has published during the past year some exceedingly interesting and valuable reports on water powers and the growth and use of water powers in Canada.

I do not desire to repeat what these reports indicate except the summary that the power capacity of water power stations used for all purposes, is at present increasing at the rate of about 200,000 h.p. per year. It may be fairly stated that at least three-quarters of this amount is for electric station use, and represents the growth of our own industry in Canada. It seems probable that for a number of years this rate of increase will be maintained or exceeded.

Taking the capital cost—including all items of financing, etc., into consideration, there must be invested at least $200. for every horsepower, to deliver that power to the consumer. 150,000 h.p. at $200 per h.p. means investment of $30,000,000, in capital expenditure for this kind of work. A little less than half of this amount is financed in Ontario by the Government owned utilities, and the balance we must look for through the investment houses of Canada.

Hydro-electric utility bonds and other forms of security, have and are enjoying a well deserved reputation in Canada. I want to press this phase of the situation forward, because in this country we hear a great deal of the engineering, operating and political sides of the problem, and not so much of the most important of all—the financial and economic.

Knowing the local conditions, engineers and operators, members of this association can build and operate plants in Canada better than any others. We are just begining in a big way to do this work. I want to urge upon all our members to think first of all of the financial sides of their problem. The best engineering is really the cheapest, but the management should, and must, exercise the greatest economy in all capital expenditures.

Consideration of Financial Problems

In the early stages of the financing, a careful balance must be maintained between the needs of the enterprise and the cost of financing. Many a good scheme has been badly crippled for life by starting out carrying too heavy a burden. For several years past the cost of financing has been so high that only our best companies could afford to do anything.

In 1912 the average cost of money to good hydro-electric enterprises was about 5%. In 1921 this cost had increased to about 8% or 9%, a prohibitive figure for expansion. In 1922 we see an improved condition; the good companies can finance to-day for about 6% to 6½%, and we are confident that within a year we can get money on a 5½% to 6% basis. This is a vital matter, as it means we can now look forward to the development on a large scale of our waterpower resources, and further we can make plans for such development reaching several years into the future. The fact that money is getting cheaper will also push higher the market value of those dividend paying stocks that pay from 6% to 8%, and as these stocks go up the whole question of raising new capital for more extensions gets easier.

There is no enterprise more affected by the cost of money than the development of waterpowers. The cost of power on the bus bars of a waterpower station is made up of about 85% interest charges and 15% operation, maintenance and taxes. Just a word about taxes.

Just a Word about Taxes

Taxes which before the war constituted only about 1% of the total cost of power, now amount to some 7% or 8%, and in many cases are equal to or greater than the combined operation and maintenance. This matter is of importance in considering government owned as against privately owned utilities. It is also important as a powerful urge to our association to co-operate with others in working out the problems of this country so that taxation may be reduced.

And now, as I have nearly finished, I want to make a plea for this Association. It is evident, I think, from the remarks I have made, that there is in Canada a great need for just the kind of an association that we represent. We should do everything possible to strengthen the hands of the executive of the C.E.A. and both with money and work help build up a strong, able association, which in turn will be of great use to the electrical industry in Canada.

Good Lighting an Essential in the Efficient Conduct of Business

Expenditure of One Half of One Per Cent. of the Pay Roll Increases Output Five Per Cent.—A Saving Equal to Ten Times the Expense

By J. H. O'HARA*

When adequate and satisfactory illumination is substituted for the all too prevalent poor illumination in factories and other working places, the results obtained are mutually beneficial not only to the employees and the employers but to the country as a whole. Under proper illuminating conditions the health, contentment, safety and skill of the employees are maintained at a high standard, the output is increased in quantity and improved in quality, while there is a proportional reduction in the cost of each unit of finished products that reach the public.

While it is desirable to have adequate illumination of the working areas, it is more desirable and essential to proper results to eliminate that light which otherwise would pass directly from the lamps to the eyes of the workers. That is, one must avoid direct glare, which is fatiguing to the eye and causes incorrect estimation of sizes and location of objects in the field of view.

Glare effects may be caused not only by light reaching the eye direct from the sources having a brightness greatly in excess of the brightness of the objects viewed, but they may be produced by excessive reflection—called reflected glare—from the objects within view. In factory lighting each lamp should be so located that the eye does not see it in the ordinary course of work, and so shaded or covered that brilliant reflections are avoided. The desired result can be obtained by putting over the lamp an open shade, which screens it and directs downward much of the light which would otherwise be either of no value, or actually detrimental. Or the lamp may be surrounded with a diffusing globe, dense enough so as not to reveal the form of the actual light source within, but to give the effect of the light pouring from the globe as a whole.

While the necessity of good lighting is so evident that a listing of all its effects may seem commonplace, these same effects are of such great importance in their relation to factory and mill management that they are well worthy of repetition and careful attention.

The effects of good illumination and bright and cheerful surroundings include the following items:—

(1) Reduction of accidents.
(2) Greater accuracy in workmanship.
(3) Increased production for the same labor cost.
(4) Less eye strain.
(5) Promote better working and living conditions.
(6) Greater content of the workmen.
(7) More order and neatness in the plant.
(8) Supervision of the men made easier.

In this list it will be noted that items 4, 5, 6, 7 and 8 all have a bearing on accident prevention.

A study of this subject convinces one that—aside from the humanitarian standpoint—the expense incurred in obtaining satisfactory illumination will in practically all cases result in good financial returns.

While the major consideration in the eyes of the factory or mill owner is undoubtedly and quite naturally the money value of good light in the larger return of both quantity and quality of work which may result from the installation of a superior as compared with an inferior lighting system, it should be noted that it is very difficult to interpret into dollars and cents the value of good light made possible by such returns. This difficulty is due to the necessity of keeping all conditions in a factory or mill section absolutely constant while varying the amount of illumination from poor to good conditions, in an effort to determine the output and its dependency on the light facilities. As accurate data becomes available, giving the increases in production for certain specific improvements in artificial lighting, it will doubtless prove helpful to a proper interpretation of adequate light and its worth to any plant.

The eight foregoing points are emphasized as forming the most important features in the problem of good lighting. Although difficult to interpret into money values, and somewhat intangible, they are indisputable arguments in favor of the best available from the standpoint of the factory or mill owner.

A Practical Example

Continuing from the manufacturer's point of view it may be said that certain assumptions as to energy costs, cleaning, interest and depreciation, show that the annual operation and maintenance cost for the illumination of a typical shop bay of 640 sq. ft. area, may be taken at $50.00. If five workmen are employed in such a bay at an average wage of say 25 cents per hour, the gross wages of the men in such a bay, plus the cost of superintendence and indirect shop expense may equal from $5,000 to $7,000 per annum. In a case of this kind, therefore, the lighting will cost from 7/10 to 1 per cent of the wages, or the equivalent of less than 4 to 6 minutes per day. We may roughly say that a poor lighting system will cost at least half this amount (sometimes even more through the use of poorly arranged inefficient lamps,) or the equivalent of say 2 to 3 minutes daily, and the installation of good lighting will unquestionably easily pay for the difference between good and bad light, through the time saved for the workmen.

Actual Losses

Superintendents have stated in actual instances, that due to poor light their workmen have lost much time, sometimes as much as from one to two hours per day on certain days. If good light will add an average of say one-half hour per day to the output, these 30 additional effective minutes represent an increase in output of 5 per cent., brought about by an expenditure equal to one half of one per cent. of the wages for improved lighting, or a saving equal to ten times the expense.

Remarkable improvements have been made in the electric lighting field. Possibilities in factory and mill lighting are now obtainable through the use of the new gas-filled lamps which were previously unthought of or considered impossible. Consideration of the eye as a delicate organ, together with the new ideas as to the times which affect its comfort and efficiency have resulted in establishing certain principles in illumination work and have directed attention naturally and in a growing manner to the proper use and application of these new lamps.

We now have a new era in industrial illumination, a distinctive feature of which is the scientific installation of lighting units, suiting each to the location and class of work for which it is best adapted. While certain outstanding cases of improved lighting exist in Canada, there are far too many instances of very poor illumination conditions, where the intensities will not check up with the minimum values of illumination that should be found in a factory as shown in the following recommendation for minimum intensities of illumination:

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*Before the C.E.A. Convention.

Minimum Illumination

	Minimum foot-candles on the space or at the work.
(a) Roadways; yard thoroughfares	1/50
(b) Storage spaces; aisles and passageways in work-rooms, excepting exits and passages leading thereto	1/4
(c) Where discrimination of detail is not essential Spaces, such as hallways, stairways, exits and passages leading thereto; toilet-rooms, elevator cars and landings. Work, such as: handling material of a coarse nature; performing operations not requiring close visual application; grinding clay products; rough sorting; coal and ash handling; foundry charging.	1/2
(d) Where slight discrimination of detail is essential Spaces, such as: stairways, passages and other parts of power plants where there are exposed moving machines, hot pipes, or live electrical parts. Work, such as: rough machining, rough assembling; rough bench work; rough forging; grain milling.	1
(e) Where moderate discrimination of detail is essential Work, such as: machining, assembly work, bench work, fine core making in foundries.	2
(f) Where close discrimination of detail is essential Work, such as: fine lathe work, pattern making; toolmaking; weaving light colored silk or woollen textiles; office work; accounting; typewriting.	3
(g) Where discrimination of minute detail is essential Work, such as: watchmaking, engraving, drafting; sewing dark colored material.	5

The above are minumum requirements such as are necessary for bodily safety, and are not to be taken as productive intensities in accordance with the accepted modern illuminating engineering practice. To illustrate, the intensities shown would enable a machine operator to see moving wheels and belts if 2 foot-candles were provided on the work as called for under the listing "E" under the head of "Moderate Discrimination of Detail," but such illumination would not enable the operator to easily discriminate between moving gears, or caliper a spindle or read a micrometer.

Types of Reflectors

In the industrial lighting field there are at present three distinct types of reflectors, which are especially worthy of consideration. The relative advantages and disadvantages of these types are indicated in the following tabulation, brought out as a result of the tests made over a period of many months by a committee of consulting engineers employed for the purpose by the State of Wisconsin.

A description of these reflectors might be of value. Porcelain enamelled reflectors are made of steel, on the surface of which is coated a bath tub enamel. This enamel coating must be dense, so that as little light as possible penetrates to the steel, for all the light that reaches the steel base is absorbed and absolutely wasted. Enamels vary considerably in efficiency, and if of two reflectors one appears grey in comparison with the other that one is sure to be considerably lower in efficiency.

The R. L. M. Standard reflector is a porcelain enamelled steel reflector and is an attempt on the part of the reflector and lamp manufacturers, who jointly worked out this standard, to make it easy for the industrial management to secure good illumination. A number of the leading reflector manufacturers make this type.

Mirrored glass reflectors are made of clear glass blown in the shape of a reflector, on the exterior surface of which a thin layer of silver is coated, and this in turn covered by a protective enamel. To eliminate the brilliant images of the lamp filament or streaks and striations which would appear on the surface illuminated, the reflector surface is corrugated.

Prismatic reflectors are made of clear optical glass with many small prisms composing the entire body of the reflector. Light control is accomplished by the use of totally reflecting prisms which are arranged in definite relation to the light source. The prismatic reflectors and units are designed according to carefully worked out engineering calculations. Their prisms may be refracting, reflecting, or diffusing, and any type of light distribution may be secured with the greatest possibility of accuracy and flexibility.

Since the light in the case of the industrial units is reflected by clear glass only, the absorption is low and the efficiency of these reflectors is exceedingly high.

Indirect Lighting

During the past few years there has been a growing tendency to employ indirect lighting in industrial service. In general, indirect lighting will be found desirable and profitable where a combination of the following conditions exist:—

(a) Work involving rather close discrimination of detail.
(b) Flat ceilings with relatively few obstructions such as overhead belting.
(c) At least moderately clean conditions of work, with respect to dust or oily dirt thrown by belting of machines.
(d) Moderate number or large number of workers per unit of floor space—say 15 or more per thousand square feet.

Where the product of the work is of particularly valuable character or where errors of the worker will result in especially costly losses, indirect lighting will generally be desirable even though not all of the above conditions exist.

Indirect lighting is especially to be recommended for many of the operations of the textile industry.

The advantages of indirect lighting arise from the facts (a) that, properly installed, it is equal or even superior to daylight with respect to minimum eye fatigue and eye strain; and (b) that it eliminates sharp shadows of an objectionable character. These advantages not only make for the safety of the worker and for good hygienic conditions, but they stimulate production and decrease spoilage to an important degree.

Spacing of Units

Proper spacing of indirect units may be easily determined as follows:—Subtract 3 feet from the ceiling height of the room; multiply the result by 1.8 to determine the best spacing; or multiply by 2.4 to determine the widest permissible spacing. In general sufficiently satisfactory results will be obtained if the spacing does not exceed twice the

A group of delegates to the Canadian Electrical Associati

value obtained by subtracting 3 feet from the ceiling height. For the same size of lamp indirect lighting units will produce about 60 per cent. the illumination on a 36-inch horizontal plane secured with the shallow-bowl porcelain-enamelled reflector, provided the ceiling finish is white.

It will be noted that light units may be spaced considerably further apart when indirect lighting is employed than when direct lighting is employed. This results in the use of fewer light units; so that while the cost of one indirect unit is greater than that of one direct unit, the total cost of installation is usually approximately the same. Indirect units should be mounted at such distance below the ceiling that the entire ceiling is lighted to an approximately uniform degree.

Treatment of Special Case

A special condition sometimes met with in indirect lighting installations, a condition where special treatment is required, deserves special notice. The condition referred to is that where the worker stands close to the wall of the room, facing away from the wall, the work being approximately vertical and facing toward the wall. The ordinary type of indirect lighting installation will not produce, under these conditions, sufficient intensity of illumination on the work. To provide such adequate illumination, the upper portion of the wall behind the worker should be painted white to a distance of approximately five feet from the floor, and angle reflectors should be so located as to brightly light this wall, the spacing of such reflectors being half the spacing of the indirect lighting units which illuminate the rest of the room.

Avoid Local Lighting

Local lighting is generally to be avoided, though there are occasional industrial conditions where its use may be preferable to any system which provides only general illumination. The most frequently experienced objection to local lighting, and one of very considerable importance, is that the local light of one workman is apt to be so adjusted by the workman himself as to shine into the eyes of any other workman, thereby involving both eye fatigue and a danger hazard, often of serious magnitude. Where local lighting may properly be employed, it is seldom desirable to use a larger lamp than the 50 watt size. Indeed, the 15 watt lamp or the 25 watt lamp is usually preferable, while miniature lamps of very low voltage also have their proper field of application.

Yard Lighting

Although the illumination required in yards is of a much lower order of intensity, the same general principles apply as for interior lighting. In general, lamps may be installed farther apart than for interior lighting, by using special widely distributing reflectors, but care must be excercised that the illumination at any point is secured from more than one direction, otherwise there may be deep shadows cast, where there ought to be light to reveal danger points. This sets certain limits upon the area it is desirable to attempt to illuminate from a single source. Yard lighting lamps should be mounted at least 20 feet above the ground level, higher if possible, to shorten the shadows and minimize glare. If the lamps must be installed lower than 20 feet, lamps larger than 100 watts should not be used. Shallow bowl porcelain-enamelled reflectors of the weatherproof type may be used to good effect, but the spacing between units should never exceed four times the height above the ground. Prismatic refractor units permit a spacing between units of eight to ten times the height above the ground.

Flood Lighting

A comparatively recent development particularly adapted to yard lighting is the flood lighting projector. It is very useful in cases where the conditions make it necessary to install the lamp at a considerable distance from objects or areas to be illuminated. It is of great value for safeguarding property, for facilitating the carrying on of night construction work, for factory and switching yards, docks and piers, enabling necessary night work to be carried on at day-time efficiency. The flood light is not designed to throw a concentrated beam, but rather to spread light evenly over a comparatively large area. Some makes of these lamps are provided with a focussing device, by which the projecting light may be made to suit conditions, giving a concentrated ray for long distance and a wider, more diffused, light for nearby use. It is especially valuable where conditions make it impracticable to use the ordinary type of lamp and reflector, and where a span or a bracket cannot be used.

Maintenance

No paper on industrial lighting could be considered complete without reference to the very necessary question of maintenance. Lighting installations are designed to give desirable initial illumination intensities on the work, but if the illumination is to continue satisfactory, adequate maintenance must be instituted. In time, lamps, globes, and re-

Convention recently held in Ottawa, containing many well known central station figures

flectors become covered with dirt. The lamp bulbs become black and burn out; reflectors are damaged; and the electric wiring may become defective. Due to any or all of these causes the illumination in the shop deteriorates to the point where complaints are produced. The losses of time from such circumstances when totalled for a period of a year will be found, in all probability, to exceed the expense of systematic attention to such items in advance.

The loss of lighting through dirty lamps and reflectors in the average plant will run from 10 per cent. to 12 per cent. per month, and there are cases on record of losses as high as 32 per cent. in seven weeks.

Enormous losses have been shown by dirty walls and ceilings also. Those ceilings, stained and darkened by smoke and dust, are some of the initial causes of inefficiency in illumination.

A Case in Point

An office lighting installation recently examined is a case in point. The installation consisted of indirect units and had been in operation two and one-half years. The ceiling had been painted a flat white and the walls finished in a light buff. At the time the installation was made the intensity was adequate. The engineer who investigated this installation in response to a complaint found that the average illumination on the desk tops was 2.7 foot-candles, unquestionably too low for office work:

(1) The reflectors had been wiped out at regular intervals, but when taken down and thoroughly washed, the illumination jumped at once to 3.7 foot-candles—an increase of over 35 per cent., upon washing what appeared to be fairly clean reflectors.

(2) The lamps had been in service for more than two years. Furthermore, it was found that their rating was several volts higher than the average voltage of the circuit. When new lamps of proper voltage rating were substituted, the illumination increased to over 5 foot-candles.

(3) The ceiling of this office, which two and one-half years ago reflected about 75 per cent. of the incident light, had become soiled through soft coal smoke to the point where it reflected 53 per cent. The inside walls had depreciated in like proportion. Refinishing the office in its original tone further increased the illumination by about 40 per cent., or to a total of over 7 foot-candles.

Here is a case where failure to observe simple maintenance requirements resulted in an intensity of 2.7 foot-candles where an intensity of over 7 was being paid for.

There are two methods by which the maintenance of any selected standard of intensity can be assured; first, by allowing for an enormous depreciation in the light and, consequently, using much larger lamps than would ordinarily be considered necessary; and second, by maintaining the system properly and allowing for reasonable depreciation.

The second, or practical, method involves:—

1.—The use of a depreciation factor, or factor of safety, in the original design of the system to insure adequate illumination when the system has depreciated a normal amount.

2.—The cleaning of lighting units at regular, frequent, intervals.

3.—The replacement of lamps which have become blackened in service by abnormally long life.

4.—The use of lamps of the correct voltage rating for replacements.

5.—The refinishing of ceilings and walls when necessary.

Expert Assistance

The advantages of securing expert assistance in dealing with problems in illumination cannot be too strongly emphasized. The points which come up for solution are complex and varied, and require in many cases the judgment of one who has had wide experience in the lighting field.

Instruments for Determining Illumination Intensity

The foot-candle meter is the simplest and least expensive instrument having a stationary lamp and scale. The brightness of this comparison or standard lamp is regulated by a rheostat and volt meter, previously calibrated in a laboratory. When the lamp is held at the proper brightness, the spot on the scale that appears to fade out is receiving an equal amount of illumination from the comparison lamp and from the outside source of illumination, thus indicating directly the value of illumination falling upon the scale from above.

The light meter is similar, except that the battery, ammeter and photometric head are all assembled in a single tube. The comparison lamp and battery are in an inner case, to the end of which is attached the ammeter and rheostat, and which slips inside of the outer tube. The distance between the comparison lamp and the photometer cube is regulated by moving the whole inner case on which is engraved a scale reading directly in foot-candles. The ammeter is attached directly to the rheostat, and the current in the lamp is regulated by turning the ammeter about its axis. No auxiliary battery case is needed with this instrument, since the standard lamp is supplied by a regular flash-lamp battery slipping within the tube.

Bridging the Gap Between City and Country with Electrical Conveniences

An Interesting Review of the Progress That Has Been Made in Reaching the Rural Districts

By P. T. DAVIES*

A questionnaire was issued to Member Companies and it was found that there was no similarity between the rates or procedure as to ownership of extension or as to the practice in financing extensions; neither was there any similarity in the amount of electricity used by farming customers in different sections of the country, and finally, the farming customers as such, are practically non-existent on the lines of the Public Utilities operating in Canada.

Definition of Rural Extension

An attempt to define a rural connection has been made by the N.E.L.A. Committee, so far without arriving at any standard. It was thought that any extension outside of municipal limits, in which an operating Company has a franchise, might be considered as a rural extension; on the other hand, for tax evasion purposes it is frequently the case that a community will spring up just outside municipal limits and that the type of business to be served will be exactly the same as within the municipality. Such customers might be considered as urban customers, but there is always a point where business thins out and the customer of the rural class, i.e., one requiring special investment, will appear. Again, such districts as a rule, are not incorporated and do not contract for street lighting service and the revenue per pole is therefore reduced.

Investment by Companies in Rural Lines

It was thought that where the density of customers is more than 10 per mile, that Companies might possibly invest some money in the construction, but care must be taken to watch all the items on the debit side.

Ownership of Lines

It seems essential that Companies should retain ownership of lines. The reasons are well set forth in the N.E.L.A. Committee's report, and are briefly that customers are not able to maintain lines properly and are liable to let them run down; secondly, they are not strong enough financially to take care of any liability, so that such liability might revert back on the Company; thirdly, they take up valuable right-of-way, and if such lines are at any time required to carry higher voltages or are changed to transmission lines, it is not easy to arrange the change.

Payment of Line by Consumer

Payments for lines are better made outright or 50% before starting the work and the balance on completion. It is very necessary to have a definite understanding as to what is to be paid, and a lump sum is preferable.

If the line is built for cost, the word "cost" should include a definitely stated overhead, otherwise it is difficult to establish such items as purchasing expenses, rents, etc., which are a legitimate charge against all material handled. Wherever possible, farm help should be used, and all material such as poles, obtained in kind; this cuts down the amount of money which the farmer has to supply in cash.

When making contracts for building lines for customers, arrangements should be made to have the customer trim all trees on the extension.

Permanency of Business, Experience of Rural Telephones

There is already considerable experience, both in Canada and the United States, of cases where farming customers have discontinued their use of telephones in such numbers as to make it impossible to give service even at cost.

In a case in Ontario recently, the rates were raised a very small amount, i.e., from $15.00 to $18.00 per annum, and out of 2,200 telephones affected over 600 were taken out.

Farming districts often run down and the farmers move into town. There is no certainty that farms will be permanently occupied, the New England example being a case in point.

There are other classes of business in small communities which cannot be depended on. The sash and door factories are seldom permanent and grain grinding often drops off, business being entirely dependent upon the operations of the big milling companies who reduce the price of feed and put the small grinding plants out of business. Quarries and brick yards are also very uncertain; several cases are known of quarry districts which have been fine revenue producers, which are idle to-day without much possibility of their ever re-opening. Mining is also precarious, and no money should be invested by companies to deliver services to mines. Small railroad division points are also subject to change and removal, and coaling points on railroads similarly change with a change in management or traffic density.

Great care should always be exercised in making extensions for business which may as time elapses, disappear.

Apparatus for use on Farms and KW.H. to be Expected

The following apparatus can be used on farms with the following approximate kw.h. per month:—

Lighting	from 15 to 30 kw.h.
Cooking	from 150 to 300 kw.h.
Pumping	from 10 to 200 kw.h.
Milking	from 100 to 200 kw.h.
Silo-filling	100 kw.h. per annum
Chaff cutting	30 kw.hrs. to 50 kw.hrs. per month
Refrigeration	150 to 200 kw.hrs. per month
Wood cutting	100 kw.h. per annum

Fallacy of Selling Silo-filling and Threshing Outfit to Farmers

Silo-filling calls for a 7½ h.p. motor and the use is about two days per annum. Threshing calls for 10 h.p. with the use of two days per annum.

It is much better to let the farmer take care of this business with a gas engine.

Wood sawing is not at all a profitable load, requiring 5 h.p. motor at least and being used a few hours per annum.

Transformer Losses and High Maintenance Cost of Lines

Transformer losses on rural lines can easily exceed the kw.h. usefully employed. The power-factor also is very low on these lines and the resulting cost to the Company is much higher than for city service. The diversity also is very poor and generally a transformer is required for each customer. Assuming for the smallest class of customer that a 2½ kv.a. transformer is used, the loss on this would be at least 30 watts; this taken over a whole year requires 263 kw. hours.

Power-factor on this energizing current is around 18% to 20%; when it is considered that allowing for diversity, lighting consumers average only 100 watts apiece, it will

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*Before the C.E.A. Convention.

DATA OF CERTAIN RURAL ELECTRIC LINES IN WISCONSIN OWNED BY THE FARMERS

Company	Average rate first K.W. Hr. cents.	Minimum monthly charge	Revenues, 1921.	Expenses, 1921	Amt. left for return and depreciation. 1921.	Minimum depreciation requirement 1921.	Minimum return, 1921.	Deficit, for 1921	Deficit per consumer, 1921.	Average consumption per consumer, 1921.	Energy purchased 1921, K.W. Hr	Energy sold, 1921, K.W.Hr.	Per cent loss.
*A	12	$2.00	$4,779.33	$4,774.12	$ 5.12	$1,633.41	$3,266.88	$4,895.20	$48.95	$46.00	$101,940	55,348	45.7
B	10	1.00	282.70	317.16	34.46	140.48	280.96	455.90	56.95	31.00	6,984	2,964	57.4
C	18	3.50	564.91	‡801.40	236.49	360.00	720.00	1,316.49	57.40	9.00	9,240	2,518	73.0
D	15	3.50	498.06	464.54	33.52	133.00	266.00	365.48	30.46	......	5,477	....	....
E	†10.1	‖	2,681.54¶	2,348.18¶	333.36¶	653.31¶	1,306.69¶	1,626.64¶	27.11	41.00	30,701	17,182	44.0
F	13.2	3.50	922.65	796.21	126.44	140.00	280.00	293.56	21.00	.	10,938	..	.
G	14	2.00	85.18	151.92	66.74	156.46	312.93	262.29	37.60	....	¶¶1,340	.....	....
H	30		1,507.07	1,381.89	125.18	368.00	736.00	978.82	36.50	43.5	49,400	14,140	71.6
I	13		......	.....	...	70.00	140.00	**510.00	‡‡67.75	...	....	....	...
J	9.8	††	1,638.81	1,195.31	443.50	461.00	922.00	939.50	24.60	21.6	22,260	9,856	56.0
K	11.2	1.50	1,129.09	1,264.99	135.90	261.00	522.00	918.90	23.60	22.6	36,804	10,600	71.0
L		.	941.06	1,167.78	226.72	140.92	281.84	649.48	23.20	.	7,941		
M	12	1.25	407.24	327.16	80.08	132.80	265.60	318.32	18.70	..	9,171	.	.

*Company has grist mill on line which consumes about 1000 K.W. hour annually. ‡Cost of energy plus meter reading, labor only. †Minus 1 cent discount. ‖ Rural charge, 1½ K.V.A. transformer $2.50, 3 K.V.A. $3.50, effective last two months. ¶Seven months only. ¶¶Five months only. **Yearly requirement for minimum bill, depreciation and return. ‡‡Same as ** per consumer ††Demand charge of $1.00 per month-added.

be seen that the extra demand to take care of transformer losses represents 30% on the demand 100% additional kw. hours.

The maintenance cost of lines, meters, transformers, completely outside of the commercial cost of billing and collecting, assumes a figure approximately $100.00 per mile per annum, when the maintenance has reached a steady point.

The Committee feels that it is good policy to maintain reasonably good voltage in small rural communities, as otherwise the use of appliances is non-existent and the service not popular. Good voltage will increase the revenue obtained per customer.

A factor which cannot be neglected, is that of inductive interference. Companies are liable to create such conditions if rural lines are put up near telephone lines and the cost of straightening out the interference is considerable.

Rates, Whether Special or Anchored to Nearest Town Rate

It would seem advisable to use the rates in the nearest municipality and add a fixed charge to cover extra transformer losses, increased cost of billing and collecting, and extra maintenance costs. This fixed charge can not be less than $2.50 per month.

Meter Reading Methods, Bi-monthly, etc., Post-card Readings

It is reported that in outlying districts, several Companies are using post-card readings with satisfactory results.

Meter reading is an expensive business in rural communities. Various methods are being used to cut this cost; reading every two months is quite satisfactory and the meter reader should always collect at the same time. In some cases readings are being telephoned in by the farmers. A further scheme has been to sell customer a ticket good for $5.00 or $10.00 worth of electricity, and punch off the amount used from time to time.

The Cost of Competitive Systems and Running Cost per KW.H.

In presenting arguments to a farmer customer as to why he should be glad to pay the cost of extending the service, it is well to bear in mind the fact that the cost of small isolated plants of limited capacity is very considerable; thus a well-known maker in Canada lists his machines at the following prices, f.o.b. factory:—

300 Watts	$ 425.00
600 Watts	585.00
850 Watts	815.00
1¼ KW. Plants	925.00
2½ KW. Plants without battery	1,400.00
2½ KW. Plants with batery	2,500.00

These plants, up to 1¼ kw. are for 32 volts, larger sizes 110 volts. The cost of installation, etc., will be a considerable amount and the cheapest plant will not cost much under $600.00 installed for 300 watts.

The running costs of these outfits are given as 9 cents per kw.h. by the manufacturers, but this contemplates steady running, no repairs. When all things are taken into consideration and the fact appreciated that storage batteries are in the hands of unskilled people, it will be found that the cost will be nearer 30 cents per kw.h. than 9 cents.

When it is considered that the Central Station rural line will have behind it plenty of capacity, no operating troubles, service on tap at all times, and at an economical voltage for which standard appliances can be obtained at the lowest prices, there is every argument in favor of the farmer spending just as much money on a transmission line as he will put into a liability such as an isolated plant is.

Your Company believes that where it is impossible to connect up a farmer, from a point of view of the present cost, that the sale of an isolated equipment is a good policy. Once a farming customer has used electric service he will not be satisfied with anything else. Various cases are known where immediately Central Station service is available isolated plants are shut down, and a recent case is reported where six users of isolated plants clubbed together and paid the cost of the extension to meet the Central Station Company line.

Cheapening of Construction, Reference to Underground Work in Ontario

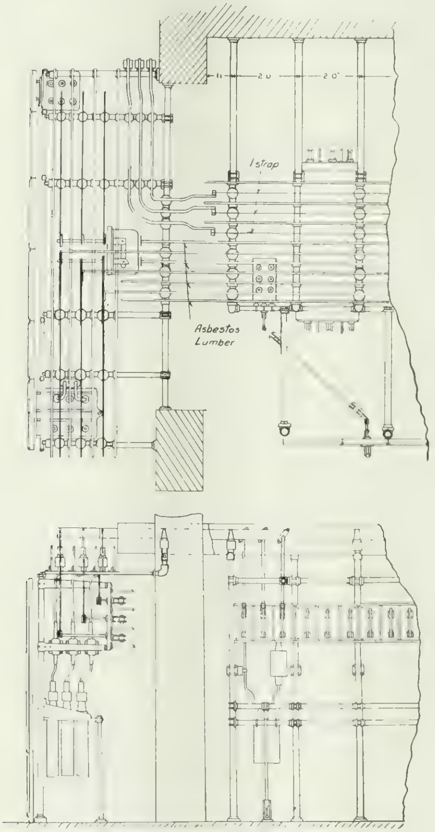
In order to bring more of the farming business into the economically possible class, it is desirable that cheaper methods of construction of rural lines be developed. This

(Concluded on page 54)

Enlarging the Brantford Hydro Station

Some Unique Features in an Installation Where Maximum Capacity in Minimum Space was the Main Problem

The equipment which was originally installed in the Brantford hydro-electric sub-station was thought to be of sufficient capacity for some years to come. Here, as elsewhere, however, the demand for electric power grew at a rapid rate and during the first five years that power was supplied it became evident that the first installation would not supply the demand. The result has been that there have been two additions made to the original building, giving sufficient capacity.



Feeder Board Layout, Plan and Section

The original station had room for three 750 kv.a. transformers. Later, the street railway was taken over and this necessiated the addition of two more 750 kv.a. transformers and three 200 kw. motor-generators. The housing of these was provided for by the building of the first addition to the original station.

Industrial demands made themselves felt in the gradual absorption of the installed capacity. In 1920 the situation was such that it was decided to build a second addition, providing space for six 1,500 kv.a. transformers.

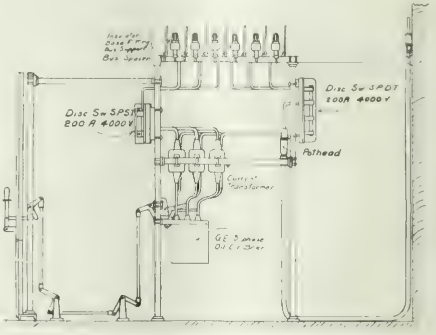
Transformers and Feeder Board

The drawing which is reproduced herewith gives the layout of the switchboard, switching equipment and transformer connections, as now constituted. At the present time there is one 1,500 kv.a. transformer, the remainder being 750 kv.a. The transformers are so mounted on platforms with rails that when they are eventually replaced with the larger capacity (1,500 kv.a.) they will be readily removable. A twenty ton capacty tackle will handle this job. The transformer control panels are placed in the transformer room at the end of the feeder board.

An unique example of a well planned installation is given in the accompanying photograph of the remodelled feeder board. The new scheme is based on somewhat the same general plan as the old one with improvements in the layout. One of the defects of the original board was that the spacing of bus, current transformers, etc., was too close and with the then transformer capacity and ever increasing load, and relay settings on the 26,000 volt going higher, a rupture would have been a serious matter. The new board was designed with these facts in mind and the photos and drawings tell the story. Previously the feeder oil breakers were mounted on sixteen inch panels and the entire board was placed about 8 feet from the wall. Now all the feeders have twenty-four inch spacings and it is possible to use breakers of considerably larger capacity than was possible with the sixteen inch spacing.

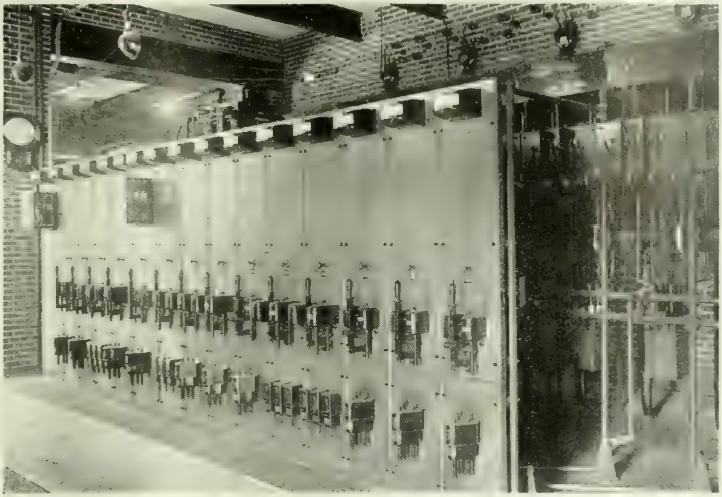
Auxiliary Bus is Very Useful

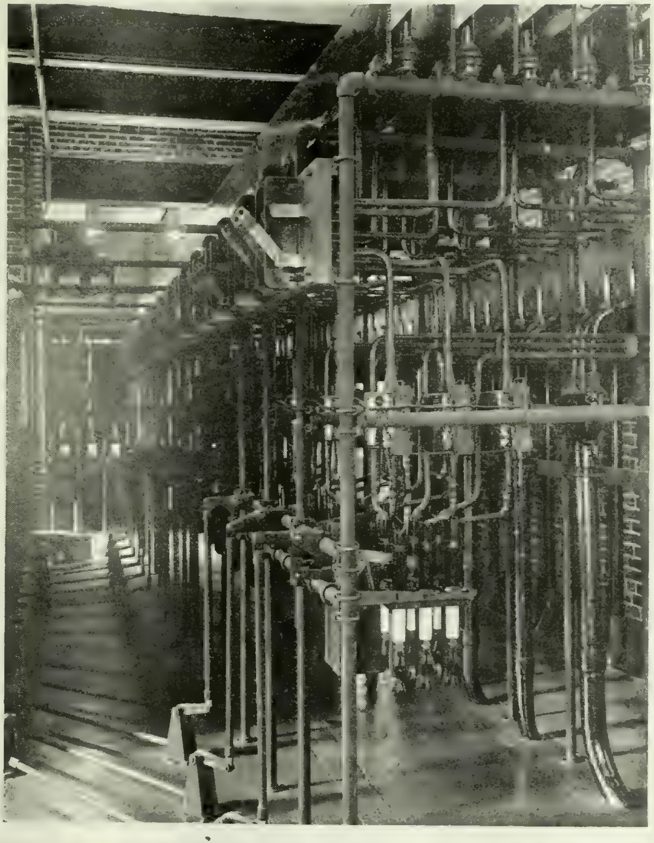
An auxiliary bus was installed in connection with the feeder system. This provides a number of possibilities that make it a very handy piece of apparatus. For instance, it was desired to tie a lighting feeder on to a power feeder while increasing the size of the copper on the lighting feeder. This could not be done because the current transformer capacity on the power feeder was too low. The difficulty was overcome by using the auxiliary bus which has 300 ampere capacity on 4,000 volts. Another feature of having an auxiliary bus is that it is possible to work on replacement and repairs of any feeder at any time without making an interruption. It is also possible to put a graphic meter on the auxiliary bus and get charts of any outgoing feeder.



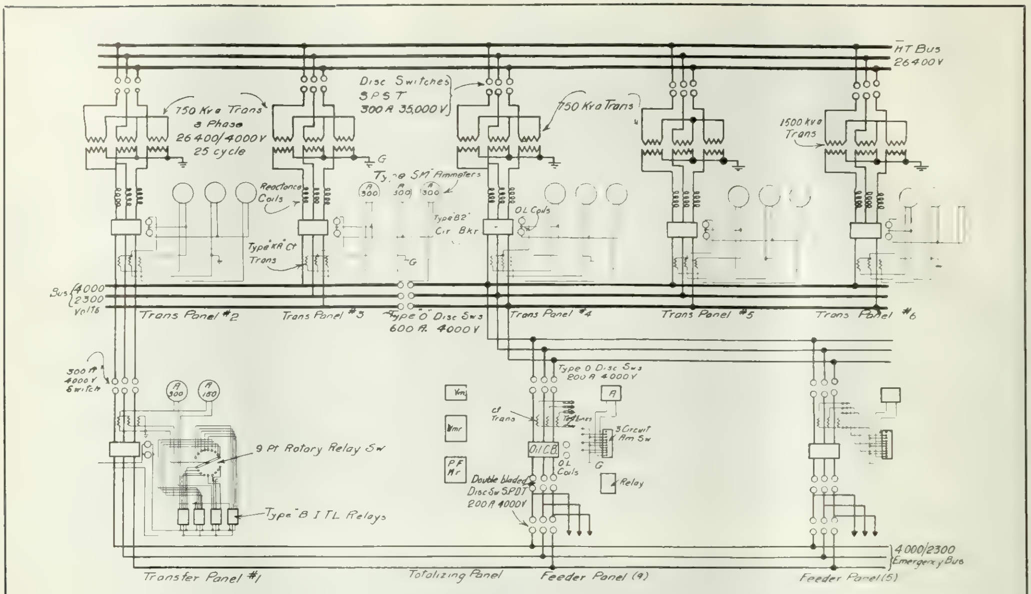
Arrangement of Circuit Breaker and Bus-bars

The method of changing over a load to the auxiliary bus is to close the top disconnecting switches on the double throw panels at the back. The auxiliary bus oil switch is then closed, paralleling the oil breakers. The feeder breakers are then opened and if work is to be done on the feeder





Above—Front view of the new feeder board of the Brantford Hydro-electric System; 15 twenty-four inch panels. Below—Back view of the feeder board. Plenty of room for each breaker and sufficient clearance at rear. Conductors supported on Type "H" insulators and fittings and separated by asbestos lumber



Transformer and Switching Equipment Diagram—Brantford Hydro-electric System

apparatus the bottom disconnecting switches on the double throw panels are opened and also the disconnecting switches on the single throw panels. This isolates the entire feeder control equipment.

The panel shown at the extreme end of the photograph is the totalizing panel which is not yet completed. It will eventually carry graphic instruments as well as all the relay equipment for the operation of the 26,000 volt incoming lines.

The entire equipment was laid out by the local superintendent, Mr. W. P. Catton, and installed under his supervision by the Canadian Westinghouse Company.

They Said "No" But They Bought Just the Same

When a prospect says "no" she does not necessarily mean it. Dealers and salesmen would do well to remember that simple truth.

There are various ways of getting an affirmative decision from a prospect even after she has said "no." Sometimes it takes one or more return calls—but the chances are very much in the salesman's favor, almost invariably.

One woman said "no" because she felt she didn't have the money. Instead of taking away the appliance he was demonstrating, the salesman left it and called immediately on a user who was a neighbor of the first woman and enlisted her co-operation. As a result, the second call a day or two later resulted in a sale. This case also illustrates the value of the oft-repeated suggestion to "use the user."

The other case where the prospect said "no" had as its background the woman's unwillingness to purchase without her husband's consent. The salesman made it a point to call on the husband at his place of business, sold him the idea, and then called back at the home a few days later. Conversations had undoubtedly taken place between the husband and wife in the meantime, because the sale was closed in short order.—Hoovergrams.

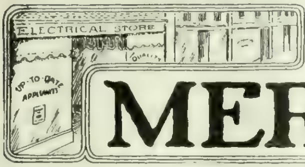
Radio Sales Increasing

Recent reports indicate that a large number of new radio companies are being incorporated. There have been reports to the effect that the patents of some of the older companies have been infringed but so far there has been no action taken in the matter. Surely, there will be a day of reckoning but as yet it is afar off. A good idea of the activity in this line is furnished from the knowledge that licenses are being taken out by newspapers and others who had no connection with the game before.

In regard to the type of set that will be used, it is said that unless the number of broadcasting stations increases so greatly that there is one within 25 miles of every home in the populous districts of the country, the sale of crystal sets ranging in cost from $15 to $40 and receiving only up to 25 miles will not be practical. It is believed that the higher-priced vacuum tube and amplifying sets, ranging in price from $75 upward, will be most in demand.

Two projects that it has been stated will involve the expenditure of over $1,300,000, have been commenced by the B.C. Electric Railway, one being the construction of a new 640-ft., dam and the rebuilding of the present dam at Stave Lake, permitting the addition of a fourth power unit, to cost $1,250,000, and the other being the extension of the Broadway West line, in the city, to cost some $75,000. Already over 200 men are at work on the Stave Lake job and a big gang is being put on the street car line extension.

Mr. Norman H. Spreight, of Georgetown, Ont., has recently opened an electrical appliance store in that town and is carrying a complete line of electrical appliances, including "Miss Simplicity" electric washers, National ranges, Sweeper-Vac cleaners; also radio equipment. Although Mr. Spreight has been in business but a short time, he has been very successful and plans to secure a much larger store in the near future.



BETTER MERCHANDISING

Valuable Report of Merchandising Committee of C. E. A.—Knowing Cost of Doing Business—Central Stations as Merchants—A Typical Sales Letter

By R. L. ATCHISON

During the last year we have gone through a rather strenuous period in the sale of Electrical Merchandise, due to the unsettled conditions which have affected the country throughout. Conditions would now appear, however, to indicate that we have "turned the corner," and that we may look for a general improvement in business. This may not develop as rapidly as might be wished for, but it will have the virtue of tending to a more substantial and steady growth. Unemployment is decreasing, labor conditions are more settled, and the dollar is climbing back to its real value. We should, therefore, be able to view the future of the sale of electrical merchandise, which offers vast possibilities, with much optimism.

Our main problem seems to be that of "Selling the Idea," and creating the desire for electrical labor saving appliances and other merchandise. We have made quite substantial progress along these lines, but still have a great deal of hard work ahead, as many people are yet practically ignorant of what the use of electrical appliances and other merchandise means, both commercially and in the home.

There are several different methods by which this can be carried out; all of which help considerably in educating the public to the need for electrical merchandise; of these, newspaper advertising plays no small part, if properly handled; a co-operative campaign of newspaper advertising by the different electrical interests throughout the country would be of great benefit. A campaign along somewhat similar lines is now being conducted in the United States by the vacuum cleaner manufacturers.

Store demonstrations, exhibits at the many Fairs conducted in all parts of the country and installations in domestic science schools are also very good mediums of education.

Generally speaking, at present, we have very few items of electrical merchandise which can be classed as "over the counter" merchandise. Our problem is, therefore, to educate the public to the need of our merchandise, and we will then have a different state of affairs than now exists. We can then reasonably expect the public to come to our stores to purchase our merchandise, as they now do in many other lines, such as hardware, furniture, etc.

Cost of Doing Business

In recognizing this fact it naturally follows that the selling expenses from a retail standpoint must necessarily be very high, as many of our appliances must be sold on a "specialty" basis, such as cash registers and adding machines. The average cost of doing business in the merchandising of electrical appliances and supplies is approximately 26 per cent on the selling price.

The figure may appear high but it can be largely accounted for by the high selling expense involved; a figure of 10 per cent. as a minimum being approximately the amount paid to the salesmen as their compensation, leaves only 16 per cent. to take care of expense involved in demonstration of appliances in customer's homes, which is practically a necessity to secure the sale, and such expenses as delivery, rent, heat, interest, taxes, together with the return which should naturally be expected on the capital invested.

Electric Store Profits

It is a more or less recognized fact that at present the electrical merchandising field does not offer a very attractive return on the capital invested, on account of the high cost of doing business, compared to the prices received for our commodities, many of which prices, particularly in the case of appliances and featured articles are being set by the manufacturers. This obviously, would appear to be a very important question for the manufacturers, jobbers, contractor-dealers, and central stations to get together on, and determine the conditions under which an improvement can be effected.

Additional capital would then be attracted, which would result in the growth being stimulated, which would prove of great benefit to all in the industry, as our business to a large extent is on the basis of "what helps one helps all."

In this connection it is quite gratifying to note many co-operative associations being organized throughout the country and through which we may hope to solve many of our problems through this "get together" spirit.

Sales campaigns, when properly conducted, supplemented by advertising generally bring very good results; one of the great difficulties in conducting a campaign is to secure competent salesmen who are sufficiently familiar with our line to get the message across and secure the business.

Sale Campaign on Ranges

It might be interesting to know that one of our member companies is now conducting a sales campaign on electric ranges, on which terms of payment have been extended to two years, with only an initial payment of $10.00 required. A circular letter explaining the proposition is mailed to a selected list of prospects and these are then followed up by a call from either a salesman or the agent in charge.

It is generally admitted that to sell the larger appliances in any volume, payments must be extended, a year generally being the limit. To cover accommodation 10 per cent. is added to the cash price. When appliances or other material are put on this basis a lien form should be signed by the customer stipulating that the appliance or material is the dealer's property, until final payment is made.

Where the dealer may not find it quite convenient to carry the paper involved in extended term payment sales, usually an arrangement can be made with some financial company to carry this at approximately 7 per cent., and advance the dealer the major part of the money involved in each sale, thereby enabling him to use this capital to good advantage.

Extended terms of payment have also been allowed on house wiring, with very good results. Frequently the contractor-dealer can effect an arrangement with the central station to help not only to finance this, but to supplement the contractor-dealer's efforts by a sales campaign conducted along these lines.

Central Stations as Merchandisers

The question has very frequently been raised as to whether a central station should conduct a merchandise business, but it has been proven that where this is conducted on a strictly ethical basis, it must prove of benefit to all those directly and indirectly interested. A greater demand for appliances and supplies is stimulated through the advertising and aggressive sales methods adopted by them, resulting in more business for all concerned. **Where the central station has dropped out of merchandising, experience has shown that contractor-dealers instead of having more business have had a decided falling off in their business.** Every central station is undoubtedly anxious and willing to co-operate in every way with the contractor-dealer, and where the same spirit is returned by the contractor-dealer, results will be mutually beneficial.

In order to conduct their merchandise department on a strictly ethical basis, central stations should charge directly against this department those expenses such as salaries and commissions, rent, interest, insurance, taxes, delivery, inventory adjustments, etc., which are applicable and would necessarily be incurred by any contractor-dealer.

Appliances and other supplies should be sold at list price, adopted by the manufacturers, and all other material on which there are no stipulated re-sale prices, at such prices as will cover overhead charges, and return a profit; thereby enabling the contractor-dealer to conduct his business along similar lines and eliminate any idea of unfair competition on the part of the central station.

A spirit of co-operation along these lines will do much to remove the little misunderstandings that occur, and establish that feeling of confidence which is so essential and beneficial.

If we are to develop the merchandising end of the business as we hope to, it must be conducted by all the different factions in a similar manner to that in which other successful businesses have followed; viz., a recognition of the different functions of each faction, and an appreciation of the benefits which each can be to the other.

Stock Turnover Four Times a Year

To properly conduct an electrical store, a very careful watch should be kept on the purchases and sales, and an endeavor should be made to have a stock turn-over of at least four times per year. Any article which remains in stock longer than six months should be placed on sale at a reduced price, if necessary, in a prominent location in the store, and when disposed of, this class of material should not again be placed in stock. With the small margin of discounts in effect by the different manufacturers, a quick turnover is essential if any profit is to be realized.

In order to enhance the development of the sale of electrical merchandise, we should only sell such merchandise as will render satisfaction and return full value for the money invested by the consumer.

Electrical stores should be kept neat and clean, windows carefully arranged at regular intervals, and appliances and supplies neatly displayed in such a way as to create the interest of a prospective customer. In describing appliances to the prospect, our talk should be in simple terms avoiding the use of technical terms, which only tend to confusion.

Each store should set a definite figure as the amount of business they are endeavoring to attain for the year; this figure being based on the number of customers supplied with power and lighting service in their city or town and surrounding district. The contractor-dealer could doubtless secure this information on which to base his figures from the central station, and then set his figures for the year, figuring that each lighting or power customer is a prospect for merchandise of some kind.

Electrical Cooking

Electric cooking is gaining very rapidly in favor and we feel that a great deal of productive work is being done along these lines. With the low cost of operation, and with the many conveniences and advantages offered, we can naturally expect to see a very rapid growth in the electric range business.

We believe that the manufacturers would be well advised to consider reducing the number of models or different styles of ranges, and in this way not only relieve some of their own burden, but also help the dealer to keep his stock down by only carrying two or three models. This might also help the manufacturers to reduce their costs, and reduce the price both to the dealer and the consumer.

The question of ease of repairs should also have the very careful consideration of the manufacturers. It is very gratifying to note that many improvements along these lines are now being effected, and this will do a great deal towards increasing the popularity of electric cooking.

Making Repairs

To repair an electric range has been very difficult and expensive; certain repairs taking hours to fix, resulting in an extremely high service charge to be borne, either by the central station and contractor-dealer in most cases, or by the customer where the guarantee period has expired. We would submit to the different manufacturers the question of making surface units interchangeable and easily replaced, so that in the event of any trouble with one of these units a woman could make the change herself, without having to call in a service man.

The question of water heating links up very closely with the sale of electric ranges. Several types of heaters are on the market, which are generally giving good satisfaction, but again the question of repairs enters. It is very disturbing for a customer to have a heater burn out after being in operation only one or two years, and then find that the cost of the necessary repairs is close to that of the original price of the heater.

Regarding cost of operation: different rates can be applied which will meet the required conditions, but in order to give good service and keep the cost of operation down to a minimum, every heater should be supplied with sufficient lagging for the tank and piping.

Convenience Outlets

In order to encourage the easy use of appliances, every endeavor should be made to sell the consumer the necessity for convenience outlets. This will not only result in more business for the manufacturers, jobbers and contractor-dealers in supplying and installing the material for these outlets, but in making the use of the appliances more convenient, will result greatly in increased revenue to the central station.

A great deal is being accomplished along these lines in the many electric homes which are being opened to the public, from which they are learning the necessity for adequate wiring and how electrical labor saving appliances will solve many of their housekeeping problems.

Manufacturers Help

Contractor-dealers and central stations should take advantage of the many circulars, window displays and advertising helps which are offered by the manufacturers. These should be carefully handled, as they represent a very considerable amount of money on the manufacturers' part. Circulars should be carefully distributed to prospects, and where possible, these, together with window displays, should tie in with local newspaper advertising. In supplying circulars the manufacturers should also be prepared to supply these in French, when called for. This would also apply to instruction books or cards on the care and operation of appliances.

Potential Possibilities

We have in Canada at the present time over 700,000 users of electric service, many of whom when properly sold on the idea are immediate prospects for hundreds of dollars of our appliances, and all of whom are prospects for possibly smaller amounts, and in the aggregate representing many millions of dollars. These potential possibilities can be actually realized, if we will establish among ourselves a strong spirit of co-operation and confidence.

A Typical Sales Letter

Dear Madam,—

"Eventually, why not now?" may be well applied to the purchase of an electric range. Electric cooking has so many points of superiority over all other methods that we firmly believe, as these become known, no woman will be satisfied until she has an electric range installed in her kitchen. Cooking is an art in which all women wish to be very proficient, and the electric range is the means by which this can be accomplished. Some of its many advantages are:—

Scientific Methods:

Cooking more delicious, digestible and nourishing food, with assured uniform results at a minimum of time and work.

Joy of Electric Cooking:

Freedom from excessive heat, fumes, sooty utensils, handling of fuel, wearisome, worn-out methods—convenience. Obtaining any desired heat at the touch of the switch—instantly.

Cleanliness:

No smoke, soot.—No discolored walls and woodwork. —No ashes.

Saving in Work:

Elimination of fuel handling—pot scouring; saving in food—much less shrinkage in meats.

Safety:

No danger of fire or explosion—no need for matches.

Cost of Operation:

Extremely moderate—the average monthly bill for over 1,000 of our customers being $4.00 each per month.

We want to count you among our many satisfied users of electric ranges; and are so confident of the very excellent results you will secure that we are prepared to make you an offer to place a range in your home on two weeks' trial. If, at the end of that time it has not accomplished all we have claimed, we will remove it without any cost to you.

If you desire, as we believe you will, to keep it, you may either pay us within thirty days, or extend payments on a monthly basis over any period up to two years, at a nominal increase over the cash price. On this latter basis, only the very small initial payment of $10.00 is called for, and further monthly payment of approximately $5.00 to $8.00, depending upon style chosen, until final payment is made.

In view of an order for a large quantity of electric ranges, we have been able to purchase these from the manufacturers at a considerable saving, and are, therefore, able to pass this benefit on to our customers in the form of very attractive prices, ranging on a cash basis from $75.00 to $135.00 with a nominal increase in these prices for extended terms of payment.

We believe you will agree with us that this is an exceptionally attractive offer, and that it is to your advantage to place your order now. We expect a very heavy demand, judging from our inquiries, and the ranges will be installed in the order in which instructions are received. The hot weather will soon be upon us, so why not place your order **now**, and enjoy all the conveniences and advantages from the start.

We will be very pleased to have one of our representatives call on you, and give any information you may desire; or we will consider it a pleasure to have you visit our store, and choose the style of range you desire.

All that is necessary for you to do, if you accept our offer or require further information, is to telephone or visit our office or write, and we are at your service.

Yours truly,
Southern Canada Power Co. Limited.

Financing Dealers' Time Payment Sales

The sales-stimulating value of the so-called "time payment plan" in the marketing of the larger household devices is becoming well established. Many manufacturers of such articles have followed the policy of going directly to the householder without the intervention of any middleman, and the extent to which they have offered to sell the device on partial payments has resulted in the establishment of such terms as a recognized practice.

However, the electrical appliance dealer is in closer contact with the user than is any manufacturer, and is the logical medium through which to reach the customer, but he has been prevented from following the time payment practice, due to the fact that it ties up capital during the entire life of such an account—capital that he cannot afford to do without for such a long period of time. Hence this profitable sales field is practically closed to him except in so far as he can induce his customers to purchase on ordinary terms. The dealer, therefore, has not taken the place in the scheme of distribution of such devices that his contact with the users entitles him to.

Many financing plans have been offered, but invariably by concerns whose whole object it was to make a profit on the financing itself, and with no regard to the sale of the appliance except as increased sales might affect their ability to earn increased profits. The insistent demand for a plan conceived from a sales standpoint, and particularly in the electrical household appliance field, has called into being an organization called the Canadian Contract Purchase Company, Limited, to function on behalf of the Canadian General Electric Company and certain other manufacturers who have recognized this need and have taken these measures to supply it.

In setting up the plan, **the sales value to the dealer of the continuous contact with his customer has been preserved.** The manufacturer selling his device directly to the consumer on the time payment plan is not in a position to take advantage of this element in it.

Under the terms of purchase of a household device, payments are made at the dealer's place of business, thus occasioning continuous visits to the store so long as the account remains open; and on every occasion the purchaser becomes a potential customer of the dealer on other merchandise, especially if the device that has been sold on the time payment plan is functioning satisfactorily and the dealer's service and treatment are such as to create a friendly feeling between them. The larger the number of such accounts, the more valuable is what might be termed the "franchise" thus created.

There is a widespread fallacy that the chance of loss through bad accounts of this character is great. The facts are that the losses from this source when compared with the volume of business done are nominal. The average charge customer is largely a moral risk it is true, and the security back of the account is the character and paying record of the debtor, and frequently information on these points is difficult to obtain; if the credit man or dealer is misled or makes an error of judgment, the result is a loss with no recourse toward recovery. However, the sales, under consideration are invariably made on a signed contract, one of the conditions of which is that the title will be retained in the seller until the article is fully paid for; default in any one payment matures all of the remaining ones and entitles the seller to repossession. These contracts are in effect chattel mortgages, but do not meet with the objections that accrue to chattel mortgages, on account of the simplicity with which they are drawn and the fact that they are considered an integral part of the selling plan itself.

A brief review of the Canadian Contract Purchase Company's plan of assisting the dealer and thereby stimulating the sale of the devices, may be of interest

It is a common and justifiable practice to add a differential between the cash and time payment price, to cover the cost and trouble of carrying the account. This added differential is frequently 10 per cent or more of the cash sale price. The price being set, the dealer makes the sale on time and retains whatever "down payment" he receives from the customer—the larger the better, as the more the customer has invested in the device, the more certainty there is that the payments will not be defaulted. The Canadian Contract Purchase Company buys the account from the dealer at a rate of discount determined by the length of the time payment period, the maximum being twelve months, and the rate of discount as follows: four months or less, 14 per cent; five months, 14½ per cent; six months, 15 per cent; seven months, 15½ per cent; eight months, 16 per cent; nine months, 16½ per cent; ten months, 17 per cent; eleven months, 17½ per cent; twelve months, 18 per cent.

The customer is not to be notified of the fact that the account has been sold, but on the other hand this account is left with the dealer for collection, thus retaining the sales contact previously noted.

When the account has been fully satisfied, the dealer is paid a commission equal to 10 per cent, for his services as collector, and should he induce the customer to settle in advance of the original terms, he is given an added commission of ½ to 1 per cent for each month saved. It will, therefore, be noted that if the dealer charges the customer 10 per cent for the time payment privilege, he makes a slight additional profit on the time sale over the cash sale.

As an illustration: Suppose the cash price of an article is 100; the time price is $110—$10 down and $10 per month. The Canadian Contract Purchase Company buys the $100 account from the dealer, which, paying out in ten months, is purchased at a discount of 17 per cent. The dealer therefore received $83. cash from the Canadian Contract Purchase Company in addition to the $10 received from the customer, making an immediate cash return of $93. Assuming the account to pay out in accordance with its terms, the dealer is paid 10 per cent commission for collecting the $100, making a total of $103 cash return on the time sale as against $100 on the cash sale. There is no service or other charge.

The Canadian Contract Purchase Company does not buy time payment accounts indiscriminately, but only those arising from the sale of electrical appliances produced by manufacturers with whom such arrangements have been made.

Electrical Contractor-Dealers of Ottawa Form Local District Association

The electrical contractors and dealers of Ottawa and the vicinity, took advantage of the visit to Ottawa of Mr. Laurence W. Davis, special representative of the National Association of Electrical Contractors & Dealers, to hold a "get-together" meeting. Mr. Davis had been in attendance at the convention of the Canadian Electrical Association, and, following that, had addressed a combined meeting of the French and English Sections of the Electrical Contractor-dealers' Association, in Montreal, on Monday, the 19th. On Tuesday night he returned to Ottawa, where some 35 contractor-dealers had gathered together, on the joint invitation of the Canadian General Electric Company and the Northern Electric Company. Mr. A. A. Dion, superintendent of the Ottawa Electric Co., presided at the meeting.

Mr. Davis spoke at length on the problems of the contractor-dealer, enlarging more particularly on the importance of a more complete recognition of the extent of overhead expenses. Mr. Davis quoted average figures, gathered from a large number of actual results in the United States, and succeeded in convincing the Ottawa contractor-dealers that, in a number of cases, their ideas of overhead had been entirely too indefinite.

Following Mr. Davis, Mr. K. A. McIntyre outlined the aims of the Ontario Association of Electrical Contractors & Dealers and the plan of organization, explaining how an Ottawa District association would fit into the general plan. As a result, 14 applications to join the Association were handed in immediately, and a District will be formed at once which promises to be the second largest in the province.

Mr. Gilbert Doane, district manager of the Canadian General Electric Company, was appointed temporary chairman, and Mr. Moody, representing Ahearn & Soper, for the Northern Electric Co., temporary secretary, pending organization. The first meeting will be held Monday night, June 26, and every two weeks thereafter.

Little by little the Ontario Association is taking on proportions that will make it a powerful factor in the electrical contracting and merchandising field. The next step, which should be considerably easier, will be the formation of similar associations in the sister provinces; the final formation of a Dominion executive will then be an accomplished fact.

Have Taken on New Lines

The Dominion Engineering Agency, 24 Adelaide St. E., Toronto, have just been appointed representatives in Canada for the Sundh Electric Company, of Newark, N. J. The Sundh Electric Co. are manufacturers of electric controlling devices for both a.c. and d.c. and can furnish any type of industrial control; handling, as well, any propositions for equipment to meet special conditions.

The Dominion Engineering Agency have also been appointed sales agents for Ontario for "Rawplugs." The Hydro rules have eliminated the use of wood plugs for fixing purposes, and it is claimed that rawplugs can be used at even less cost than wood and that they are more satisfactory than expansion shields or lead screw anchors of an equivalent size.

This Agency's interests, in the Montreal district, are now being taken care of by Mr. E. W. Playford, 617 New Birks Building, Montreal.

The Future of "Wireless" Is Filled With Wonderful Possibilities

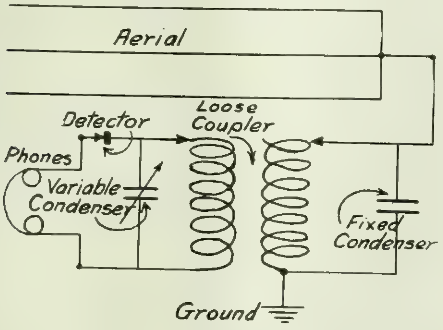
Marconi Says House to House Conversation a Development of the Near Future

The majority of receiving outfits which are used at the present time differ greatly from the single slide tuner outfit described in our previous article. It is difficult to tune accurately with such an arrangement and there are other troubles such as the reception of the inductive hum of alternating current lines in the vicinity of the antenna. Improvements have been made in every part of the receiving apparatus and it is proposed to describe some of the more widely used arrangements, dealing with such electrical theory as is necessary to explain their use.

Tuning Coils

Accurate tuning is the prime requisite for good results. For this purpose the so-called loose coupler is being largely used at the present time in place of the single slide tuner previously described. One type of this instrument consists of two coils which pull in and out of each other. The primary winding is generally the larger one and the secondary slips inside it. The secondary has more turns and finer wire than the primary. There are many variations in the construction of this type of coil, such as tapping the coils and connecting the different taps to switch points and switches. Sometimes the primary has two switches, one of which tunes a large number of turns per tap, the other being one which tunes perhaps one or two turns for each switch point. Instead of this method sliders may be used on the primary or secondary, or both. The drawing shows a theoretical arrangement.

The rotating coil loose coupler is a somewhat more compact form, in which the primary is rotated past the secondary as a means of varying the magnetic effect between the two coils. The coils should be wound in accurate slotted forms and if otherwise well constructed, give good results.



Condensers

The drawing shows, in addition to the loose coupler, a fixed condenser and a variable condenser, which were not used with the elementary set. The purpose of the condensers is to improve the tuning. They permit a more accurate reception of the signals and allow of the elimination of wave lengths which vary but slightly from the one being received. In the drawing the primary condenser is shown connected across the antenna and ground. This method is applicable to cases where the antenna is short and long wave lengths are to be received. Short wave lengths can be received if the antenna is long and a variable condenser is placed in series with it.

The strength of the signals received can often be increased by the addition of a fixed condenser. This is connected across the telephone receivers. Fixed condensers are generally of small capacity and a common construction embodies alternate sheets of paper and tinfoil.

Tuning and Resonance

It is well known that the cutting of lines of force about one coil, by another, results in a current being produced in the second coil. Under certain conditions more electric energy may be transferred from one circuit to the other, and this condition is known as resonance. The resonant frequency of a circuit is thus dependent on certain electrical features of the circuit, which are called capacity, inductance and resistance.

Inductance is the property of a coil of wire whereby it tends to prevent any change of current through it. Roughly, it increases as the square of the number of turns. Capacity may be roughly defined as the ability of a conductor to hold a charge of electricity. Condensers give capacity, hence their use in the circuit.

In a transmitting circuit there are generally two circuits which are tuned, that is, they are adjusted to have the same resonant frequency. Thus a pure wave of maximum power is radiated. The receiving station is tuned so as to be in resonance with the station it is desired to read. It is obvious that waves are coming in to the aerial from many stations simultaneously. It is only, however, waves of a particular frequency which build up an appreciable current in the tuned circuit, the others, unless very strong, passing through to ground unnoticed.

The drawing which is reproduced with this article represents only one of many ways in which it is possible to hook up such apparatus as is represented. It is safe to assume that the amateur who has progressed so far will not be content to stop at this point. With this in view, an article will be published in the future showing some of the further refinements that can be made.

E. Kootenay Power Company Closes Contract

The East Kootenay Power Company have closed a contract with the Consolidated Mining & Smelting Company to supply power to the Sullivan Mine at Kimberly, B. C., and also for a new concentrator about to be installed at this mine. This contract calls for 3,000 h.p. immediate delivery, and all the requirements of the company up to 8,000 h.p. for a period of ten years.

Mr. Gordon Kribs, formerly assistant engineer with the Hydro-electric Power Commission of Ontario and latterly engaged in the manufacture of the Kribs Electric Washing Machine, has been appointed chief electrical engineer to the New Brunswick Power Commission.

Manitoba Electrical Association Outlines Plans for Coming Year

On Wednesday the 7th June, the representatives of all the big electrical institutions in Winnipeg, met at the Fort Garry Hotel, to discuss ways and means of putting the Manitoba Electrical Association, on a more sound footing and to map out a program for the ensuing year.

A nominating committee comprised of Morris Deering, Lee Dickson, K. N. Forbes, John Whitsell, E. H. Smith, and W. Sibbald, was appointed to draft up a slate of officers and submit the same to the regular meeting of the Association. There was considerable discussion as to what should comprise the functions of the association, and it was the general feeling of those present, that the association should function as a business organization rather than socially.

A vote of thanks was tendered to Jim Swan, manager of the appliance department of the Winnipeg Hydro, who for the past year has been acting as hon. sec. of the association. Jim has done excellent work and is deserving of praise.

J. E. Lowry

The matter of an electrical show and an electrical home demonstration was discussed. It was decided to leave this question over for the new executive to deal with.

Two other members of the association came in for their share of high tribute; Morris Deering, who for the past year has acted as president of the association, has done much to boost the electrical industry; he made an ideal president. The other member in question is H. C. Howard, publicity manager of the Winnipeg Electric Railway Co., "Bert" has acted in the same capacity for the association during the past year, and has done some really fine work, especially in editing the electrical page in the Manitoba Free Press, which has appeared weekly. A vote of thanks was also tendered to the late executive.

Association Appoints New Officers

At the usual fortnightly luncheon held at the Fort Garry Hotel, Winnipeg, on the 15th June, the following officers were elected for the ensuing year.

President

J. E. Lowry, Commissioner, Manitoba Telephone System.

Executive

M. E. Deering, manager, Northern Electric Co. Ltd., Winnipeg.

Geo. Wright, manager, Canadian General Electric Co. Ltd., Winnipeg.

E. H. Smith, manager, Canadian Westinghouse Co. Ltd., Winnipeg.

John Whitsell, manager, Winnipeg Electric Railway Co.

K. N. Forbes, manager, Canadian Fairbanks Morse Co. Ltd., Winnipeg.

J. Rocchetti, acting Power Commissioner, Province of Manitoba.

E. V. Caton, chief engineer, Winnipeg Hydro.

F. H. Martin, chief engineer, Manitoba Power Co.

L. B. Dickson, manager, McDonald & Willson Lighting Co. Ltd., Winnipeg.

A secretary for the association will be appointed from the Executive at their next meeting.

May Install 25,000 Kv.a. Standby

The Winnipeg Hydro-electric System are considering the erection of a steam standby plant as an auxiliary to their present hydro-electric generating station. Owing to the requirements of many of the consumers of electric power in Winnipeg for an uninterrupted service, the management of the Department have decided that a steam standby plant is necessary. While the interruptions on the transmission line have been very few, still the damage caused by such a storm as that of May 10th, when both the Winnipeg Electric Railway Co., and the city's lines were damaged so as to interrupt the service for some hours, has made it essential that measures be taken to provide for such contingencies. It is proposed to install 2-12,500 kv.a. turbo-generator sets with condensers. The boilers will probably be heated with oil fuel. It is also proposed to install a small electric boiler to keep the fuel feed pipes warm and also to keep one of the turbo sets turning over. Plans and specifications for the equipment are being prepared.

Now Permanent Sales Manager

Jack Wheatcroft, who for the past two or three months has been acting salesmanager for the Great West Electric Co. Ltd., Winnipeg, has now been officially appointed to that position. Mr. Wheatcroft needs no introduction to the electrical industry in the Prairie Provinces, as he has been covering that territory for the past four years for the Great West Electric Co. Jack, as he is popularly known, is a man of good executive ability, and is fitted in every way possible for his new position. A. H. Smith, formally of the Calgary office of the Great West Electric Co. Ltd., will represent the same company as special Laco lamp salesman in the Prairie Provinces, and head of the Lakes territory. He is now in Montreal visiting the factory, and will return to Winnipeg early in July. W. A. Williamson, Laco lamp representative at Winnipeg, has severed his connection with the firm and gone to Chicago.

Joins Mr. Gilman's Staff

R. A. Merritt has just joined the staff of the Winnipeg Electric Railway Co., he will be in M. C. Gilman's department, who is Sales Manager, Electric Utility, Winnipeg Electric Railway. Mr. Merritt was power sales engineer for the Toronto Electric Light Co., from 1910 to 1918, when he left to join the U. S. army. While in the army he had charge of all utilities at Camp Sherman, Chillicothe, Ohio. for the United States army. On entering civil life again Mr. Merritt accepted the position of Supt., of the Lakewood and Coast Electric Co., Lakewood, N. J. He is a graduate of Purdue University, and an electrical, as well as a mechanical engineer.

Magnitude of W. E. R. Business

The Winnipeg Electric Railway Co., claim they are employing more men today than they have for some time past. They are distributing in wages and supplies over $10,000 for each of the 365 days of the year of which amount $7,000 is for wages. In taxes to the City of Winnipeg it contributes $1,000 per day. During the past twelve months these items alone, and they are not all of the expenses of operating the company, ran close to $4,000,000. These figures illustrate the magnitude of the business which the Winnipeg Electric Railway Co., does in Winnipeg.

Electrical Equipment Co.

Oscar Boyd, and S. H. Wright, have opened a retail electrical store at 585 Sargent Ave., Winnipeg, under the name of the Electrical Equipment Co. Both members of the firm are well known in Winnipeg. Mr. Boyd was formerly in business in Winnipeg, under the name of the Winnipeg Engineering Co., for a period of six years. Mr. Wright has been associated with Mr. Boyd for the past four years, previously being the electrician at Stony Mountain Penitentiary.

Miscellaneous

The storm of Sunday June 18th, caused some damage to the distributing transformers of the Winnipeg Hydro-electric System. It is found that the transformers on the 4,000 volt star connected common neutral system, which were protected by choke coils and lighting arrestors, were not damaged. This type of protection has been installed on part of the distributing system and will be the standard as the remainder of distribution is changed over from 3 wire delta to 4 wire star with common neutral.

Work is progressing rapidly on the installation of the 12,000 volt feeders from the terminal station to No. 5 substation of the Winnipeg Hydro-electric System. The laying of the conduit, is being done by Messrs. Carter-Halls-Aldinger and it is expected that it will be completed by July 15th.

Purchase of the Walker-Schultz property, located at 425 Henry Ave., Winnipeg, for $120,000 for a storage warehouse for the Winnipeg Hydro, was recommended to the City Council on June 19th, by the public utilities committee; the council referred the matter back to the committee.

Northern Electric Engineering Society Annual Meeting

The second annual meeting of the Northern Electric Engineering Society was held at the society's headquarters on Monday, June 5th, 1922, with a large number of members present. The reports of the various officers and committees for the year were submitted and accepted, it being the general feeling that the society has succeeded in carrying out a very active and interesting programme during the season just ended.

The retiring president, Mr. W. S. Vipond, expressed the society's appreciation of the very valuable assistance rendered by the gentlemen who addressed the meetings during the year, or who otherwise assisted the society in carrying out its programme.

The election of officers for the season 1922-1923 resulted as follows:

Honorary president, P. F. Sise, re-elected; president, W. S. Vipond, re-elected; vice-president, N. R. Ashley; secretary, A. J. Lawrence; treasurer, L. R. Waller.

In addition to these officials, the following gentlemen were selected as members of the Council, to represent the various branches:—

F. J. Benoy, W. B. Cartmel, J. Shield, J. O. Beaudet, F. H. Alder.

Messrs. Vipond, Ashley, Lawrence and Waller in turn briefly addressed the meeting, expressing their appreciation and their hopes for the society during the coming year. It is the intention of the incoming Council to carry on along similar lines to those followed last year, with a view to aiding in the interchange of engineering and technical information among the engineers of the city and district. Further details concerning this programme will be available at a later date.

Every Electrical Store Should Display a Slogan

Slogans do their work in a subtle, easy way. The prospect hardly knows that he is being influenced. From day to day and week to week, his eye falls upon the familiar words and gradually and unconsciously he becomes imbued with the idea that what they advocate is the only thing.

This painless method of education is not taken advantage of by electrical dealers to the extent that it should be. Not long ago the writer had occasion to visit a number of electrical stores, and he found that **90 per cent. of them had no slogan of any nature whatever on display.** These stores were losing an opportunity—throwing away their chances as if they were worth no more than a basket of ashes!

No one can deny that the public needs to be influenced in this matter of **buying electric goods in an electric store** —if its indifference in this regard can be overcome one of the greatest difficulties in the path of the dealer will be removed. Propaganda should be distributed in every possible way, and the use of slogans is an effective method that costs practically nothing. Every electrical dealer should have one or more on display all the time.

Here are a few that are well known:

Do it Electrically

Buy Electric Goods
in
An Electric Store

Say it Electrically—
Flowers Die!

You Don't Buy
Shoes in a
Grocery Store

A small card, displaying any of the above, will fit into most window sets—a larger one of a more substantial type, would form an arresting outside display. The cost of such signs is nominal and their continued use is bound to produce results.

Vancouver Enjoying Building Activity—Electrical Industry Improving Its Condition

By **RAY E. CHATFIELD**

Secretary Manager Electric Service League of B.C.

Greater Vancouver is today enjoying greater building activity than during the boom years of 1911 and 1912. Unfortunately, however, this activity following a period of depression in the building trades has created a very serious condition which affects the building public as much, or more than it affects the building trades. The building trades are becoming alive to the condition but unfortunately the public is still blissfully ignorant. During the lull in building activities journeymen electricians, plumbers, plasterers, carpenters, etc., were thrown out of employment. Driven by necessity these journeymen undertook various small repair and construction jobs as contractors, often working for less than half the wages laid down in the union scale. Blame for this, however, can hardly be placed on the individual journeyman or group of journeymen. It was the direct result of economic conditions and an individual, to protect his family, had to work.

The growth in building activities, however, instead of tending to right this unfortunate condition only made bad matters worse. Where there had been one contractor there now were one hundred potential contractors. These inexperienced "journeymen-contractors" "jerry" contractors or curbstoners became a tremendous factor in the building business. With practically no business experience and no knowledge of costs they plunged recklessly into the stream of new business and wrought havoc.

Competition became so keen between these "journeymen-contractors" in all branches of the building trades that contracts were let for cost or even less than cost. The plumber to get a plumbing job, would attempt to put in an electric wiring installation at less than cost and vice-versa. Prices were so low that the "journeyman-contractor" was always two or three jobs in arrears with his supply house, and it was absolutely essential that he keep working continuously so that to-day's job would pay for the material used on a job last month, etc.

The general contractor made capital of this condition and played one "journeyman-contractor" against the other until a job was let for less than wages necessary for the labor. Legitimate contracting firms were driven entirely from the field.

The morality of the whole building trade was lowered—buildings were skimped—sub-standard materials were used. Eventually the building public received something for nothing—a job done at a wholly inadequate price and failure stared contractor after contractor in the fact.

The mortality in the building trades grew and the supply houses suffered greatly.

The electrical industry in Vancouver is making the first determined and concerted effort to combat this evil. Under the auspices of the Electrical Service League of British Columbia the problem has been attacked from several angles.

First—the sub-contractor himself.

Second—the architect.

Third—the owner who takes out a building permit.

Meetings of the small electrical contractors who are not members of the Vancouver Association of Electrical Contractors and Dealers, are held every alternate Tuesday and the fieldman gives a blackboard lecture on the proper method of estimating and pricing a job—these meetings have been held for several months and are producing excellent results.

The league has prepared a little pamphlet " The Cost of the Lower Bid" which has been sent to every registered architect in the Province.

This little pamphlet is 3 1/2 x 6 1/4 inches in size, consists of four pages and is an argument for materials of high quality and good workmanship by the **qualified man** and points out the false economy of the lowest bid for house wiring.

In addition this pamphlet is sent to every owner taking out a building permit of $2,500 or over in Greater Voncouver.

By attacking the cut price evil from the three angles of educating the electrical contractor who is attempting to do the work, of pointing out the false economy of the lowest bid to the owner and of emphasizing upon the man who is supposed to supervise and protect his client, the architect, the fact that he **gets exactly what he pays for,** and no more, in a cut-price electrical installation, the Electrical Service League hopes to make some appreciable headway in the raising of standards for the benefit of the public and of the electrical industry

This activity on the part of the electrical industry through the Electrical Service League is creating much favorable comment among the other branches of the building trades and in all likelihood will be followed by similar effort among the other sub-trades in the building industry.

What Would You Do in a Case Like This?

Here is an everyday problem in the electrical business that is typical of what the electrical dealer is up against all the time. Careful handling of such cases is always necessary and this particular one is illustrated for the purpose of obtaining from our readers their ideas of how it should be done:

Mrs. Brown bought some shades from one of our well-known dealers, whom we will call John Smith. It took some trouble to make the sale, as Mrs. Brown is an extremely fussy individual, and John patted himself on the back when he finally disposed of four, particularly because they were the last of a type that had hung on his hands for a long time.

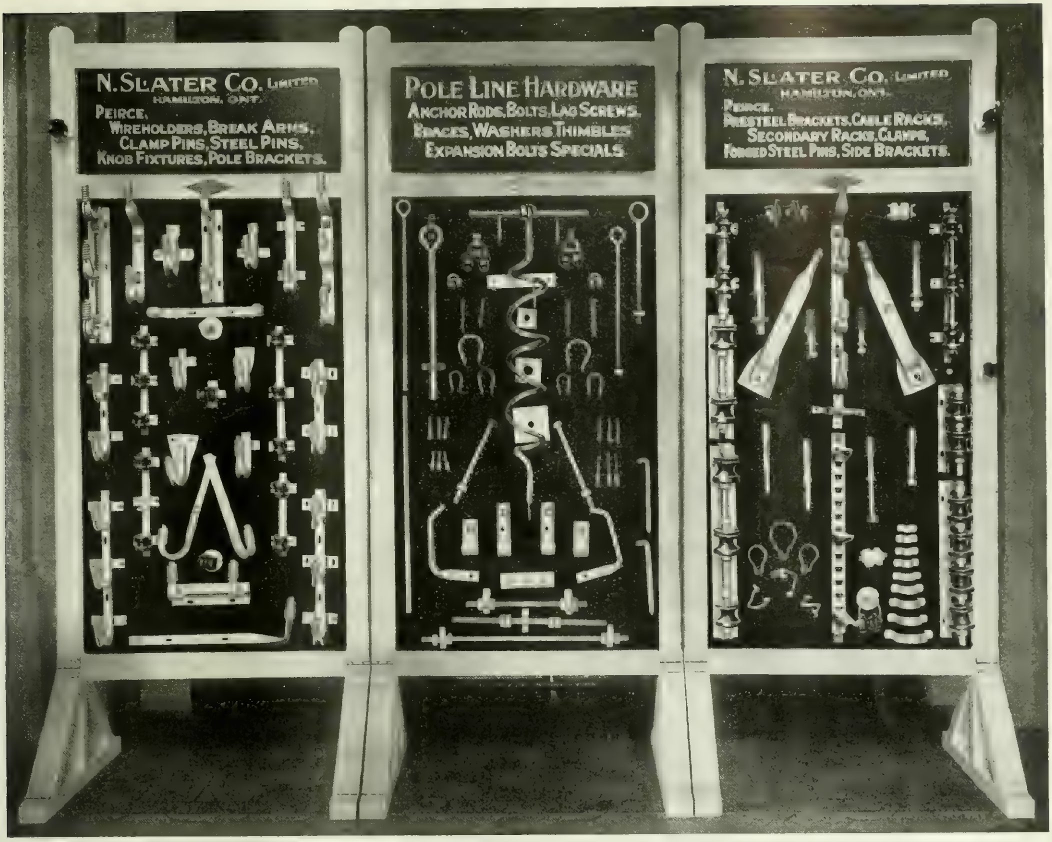
His joy was short-lived, however. Little Tommie Brown came in next day and presented to John a large parcel which when unwrapped, disclosed one broken shade. "The delivery man broke it and mother wants another," he said, and waited expectantly.

That put John in a quandary. He knew that all the shades had started from his store in good shape, and he was fairly sure that the one in question had not been broken in delivery; still, he was not certain about it. Mrs. Brown was not a good customer, but she was a close friend of some of his best.

It might be a wise thing to replace the broken shade, but he had no more on hand. The purchase of a quantity of this type, which he had found unsaleable, did not appeal to him.

What is the best thing for John Smith to do?

The Mechanics' Supply Co., of Quebec, announce that they have secured the services of Mr. G. Lorne Wiggs, B.Sc., who since his graduation from McGill University, has had a thorough practical and technical training in electrical engineering, which will be of great service to the company's clients.



Attractive Exhibit of Pole Line Hardware at C.E.A. and A.M.E.U. Conventions

A Notable Exhibit at the June Convention

The exhibit of Peirce pole line hardware shown at the Canadian Electrical Association held at Ottawa, June 15th, 17th and at the Niagara Convention of the Association of Municipal Electrical Utilities held June 22nd to 24th, created considerable comment. The exhibit in itself was quite novel, but as strictly Canadian products they were much appreciated. Peirce brackets have been prominently before engineers ever since the inception of exhibits by the Commercial Section of the A.M.E.U., having been consistently exhibited at all the conventions. This year the "quality" pole line hardware displayed upon the dark green ground of the boards was particularly pleasing. The large corkscrew on the centre board came in for special attention. This particular article was made obsolete by the O.T.A. in October, 1916: but still as a relic and reminder it was interesting. Seriously, however, it clearly shows the quality of material out of which the anchor rods and all Peirce pole line hardware are made. This company is to be congratulated on its enterprise.

Inventions Limited are distributing an attractive booklet on rawlplugs. The booklet describes the various uses to which these may be put, with a variety of interesting illustrations, and closes with opinions of architects, builders, electricians, etc., who have had practical experience in the use of rawlplugs.

The Cost of the Lowest Bid

The electrical equipment of a home to-day, no matter how simple that home may be, is a scientific problem and warrants a few minutes attention and study.

Electricity is constantly making life easier, more convenient and more comfortable for everybody and, as the world is grasping the place of electricity in the home, soon it will be the exception for a house not to be thoroughly equipped for every phase of electrical service.

Considering the importance of the electrical equipment of the home, nothing should be left to chance. The wiring should be right, the illumination properly provided for, electrical outlets conveniently placed and the materials and appliances should be what experts have decided is necessary for a safe, dependable and permanent job. In other words, your equipment ought to be standard.

Your electrical installation requires a specialized knowledge just the same as your heating or plumbing installation. The heating engineer or the sanitary engineer knows better than you do what your house requires. In these cases, if you are wise, you select a man whom you know to be qualified in every respect to give you a satisfactory installation at a fair price.

There has to be a man who **knows**, and the community has to have some means to find him. The man who knows electricity, so far as it applies to the modern household, is the **qualified** electrical contractor, who is in close touch with the latest developments in the electrical field, who employs good workmanship, uses standard materials and charges fair prices.

Nowhere is responsibility and technical competence of more importance than in the electrical field. Cut-rate, irresponsible electrical contracting service is always expensive and frequently disastrous. You seldom save more than one half of one per cent on the bid ($50.00 on a $10,000 house), and you are likely to spend five times that amount in replacing poor workmanship and sub-standard materials and in supplying the needed " convenience outlets" and wall switches whose omission made the bid possible.

The economy of the lowest bid is nowhere so false nor does it exact such heavy penalties as in electrical contracting service. You get exactly what you pay for.

The use of materials of quality and high standards will in a large measure determine the reliability and integrity of the electrical contractor.

You may look to him for advice on the location and installation of electrical convenience outlets rather than cut out these necessary features of your home for the sake of underbidding a competitor. You may safely rely upon him to provide your home with proper illumination based upon the floor area, utility and decorative features of your rooms rather than sell you fixtures upon which he will obtain the biggest profit.

In addition to buying the wiring services of the qualified electrical contractor, you will also be buying his technical skill and scientific knowledge acquired by keeping thoroughly in touch with the latest developments in his business.

The plumbing of a house generally costs about 13 per cent of the total cost; a fair basis for judging the quality and completeness of the electrical wiring, excluding fixtures, of the home has been set at 5 per cent. How does this compare with your estimate?

The home you build today is expected to remain modern for ten, fifteen years or perhaps longer. With the progress that is being made today in the electrical equipment of a home, nothing but the latest and most complete features will be economical.

It will pay in the end to give your work to a thoroughly reliable contractor, to seek and rely upon his advice and judgment and to demand completeness and quality rather than cheapness of work.

Bridging the Gap Between City and Country

(Continued from page 40)

is a problem for the Overhead Lines Committee to study.

One company is using single iron pins screwed into the pole in place of cross arms, which has resulted in a very considerable decrease in the cost of framing the poles.

The Ontario Hydro-Electric Commission is trying a new type of construction, viz., the use of single conductor, rubber insulated, lead covered, 2,200-volt cable, laid directly in the ground about 18 inches deep, plowed in. The system in use is 4,000 volts, 3 phase, 4 wire, with a grounded neutral. The main trunk lines are composed of three single cables bonded together, using the lead as the fourth wire, and single phase taps are run with one cable, using the lead as a return. This construction is reported as being cheaper than pole lines; all transformers are mounted on poles and the cable run up the pole. These transformer poles act as junction poles, so that the average distance between exposed points on the underground cable is only 500 feet.

One hundred miles of this construction is going into operation this Summer, and its operating performance will be a valuable study.

From the above, it will be noted that your Committee is making a report that is more or less a warning to Member Companies to carefully consider rural business before going into it extensively. The main problem is to develop the uses of electricity, so that the farming customer can economically supplant other methods of obtaining present results by electrical methods, and in doing so, use at least $200.00 worth of electricity per annum without creating a heavy demand.

Wisconsin Farm-owned Lines Show a Deficit

An interesting and significant study of the losses in the rural distribution of electrical energy was presented at the recent meeting of the Wisconsin Utilities Association at Milwaukee. The data are for lines that are owned by the farmers and are significant because they are taken from the files of the Railroad Commission. Deficits running all the way from $18.00 to nearly $68.00 per consumer are shown. The figures are of particular interest to central-station men who must combat the farmers' idea that the central-station company is making a mint of money out of the service. Not only has the revenue not paid a return on the investment, but depreciation has not been covered in any of the cases, and in some of them the revenue has not covered the current operating expenses. The figures should be valuable to any central-station operator who must handle rural distribution business.

Cooking is one of the most desirable loads, and when new extensions are under consideration, if the farming customers can be induced to buy ranges, an extra $50.00 per annum at least can be expected. With the gradual depletion of wood around the farms, cooking will have to be done by some other methods, and electricity is more economical than oil or coal.

On an extension made last year in the States of 2 3/4 miles in length, thirty out of thirty-six customers took electric ranges, and as a result the average income per customer has worked out at $80.80, for 1760 kw. hrs. This is a step in the right direction, and it is on these lines that the farming business can be looked forward to as good business instead of being otherwise.

Exhibits at C. E. A. Convention

The number of exhibits at the C.E.A. convention was small but the displays were all extremely interesting. These included the Lincoln Meter Co., R. N. Slater Co., and the Standard Underground Cable Co. Interesting exhibits were also shown by the Accident Prevention Committee, the Overhead Systems Committee, the Underground Systems Committee, and the Rural Lines Committee.

Mr. G. W. Barber, for the past twelve years with McDonald & Willson, Limited, Toronto, has resigned to become managing director of Electric Lighting Products, Ltd., a newly formed wholesale fixture house of that city.

The British Engineering Standards Association have just issued two interesting bulletins, the first, No. 108, entitled "British Standard Graphical Symbols for Electrical Purposes"; the other, No. 128, entitled "British Standard Specifications for Dimensions and Resistances of bare annealed wire for electrical machinery and apparatus."

"Tricable" Used in Electric Home

In our issue of June 15 we described the wiring of the Electric Home in Hamilton, Ont., and used the expression "The house was wired throughout with BX cable." This was an oversight on our part; the cable used was the armoured cable known by the trade name "Tricable." It is manufactured in Canada by the Canadian Triangle Conduit Company, at their factory in Toronto.

Current News and Notes

Barrie, Ont.

Mr. Wm. Bishop has secured the contract for the electrical work involved in the repairs being carried out to a business block on Dunlop St., Barrie, owned by Mr. Frank Jackson.

Brandon, Man.

G. T. Smith, 862-7th St., Brandon, Man., has recently entered the electrical contracting business.

George Hinners, electrical contractor and dealer, of 32-9th St., Brandon, Man., has been awarded the contract for electrical work required in the reconstruction of the Crescent Creamery Co., Brandon.

The Boyd Electrical Co., Limited, of Brandon, Man., was recently awarded a contract by the L. R. Steele Co., Rosser Ave., Brandon, for wiring, lighting fixtures and a 5 horse power motor and transformer, for cold storage purposes.

Brantford, Ont.

One-man street cars have recently been put in operation in Brantford. The entire system will eventually be put on the one-man basis, it is stated.

Burlington, Ont.

Messrs. Culley & Breay, 35 King St. W., Hamilton, Ont., have secured the electrical contract on a Sunday School building to be erected at Burlington, Ont., at an estimated cost of $22,000, for St. Lukes Anglican Church, Burlington.

Calgary, Alta.

Damage by fire to the extent of about $3,000 was recently done to the city's sub-station, located near Bowness Park.

Canso, N. S.

The Postal Telegraph Commercial Cables System has bought from the Government of Newfoundland the submarine cable from Canso, N.S., to Newfoundland.

Cornwall, Ont.

Mr. Stan. Lewis, 63 Metcalfe St., Ottawa, has been awarded the contract for electrical work on a $75,000 school being erected at Cornwall, Ont.

Dixie, Ont.

Messrs. Harris & Marson, 81A Parkway Ave., Toronto, have been awarded the electrical contract on a school building to be erected at Dixie, Ont., at an estimated cost of $45,000, by the trustees of S.S. No. 1, Toronto Township.

Hamilton, Ont.

Mr. L. H. Lander, King E., Hamilton, has been awarded the electrical contract on store and apartments, valued at $20,000 being erected on Ottawa & Argyle Sts., Hamilton.

Hanna, Alta.

The ratepayers of the town of Hanna, Alta., recently voted favorably on a by-law authorizing expenditures for the installation of an electric lighting plant.

Kitchener, Ont.

Mr. Harold C. Kress, 95 College St., Kitchener, Ont., has secured the electrical contract on a $30,000 parish hall being erected on Queen St. N., Kitchener, for St. Peters Lutheran Church.

London, Ont.

The Canadian General Electric Company has secured the contract for two 1,500 kw. transformers for the Public Utilities Commission of London, Ontario.

Moncton, N. B.

Mr. E. LeBlanc, Church St., Moncton, has secured the electrical contract on a $6,500 residence being erected on Enterprise St., Moncton.

Mr. Wm. G. Crowley, 281 George St., Moncton, hes been awarded the electrical contract on a residence being erected on Archibald St., for Pat Larracey, of Archibald St.

Mr. J. W. McCarthy, 202 St. George St., Moncton, has been awarded the electrical contract on an $80,000 school being erected on Wesley & Queen Sts., for the R. C. School Commission.

Montreal, Que.

Mr. M. Martel, has secured the electrical contract on a store and 5 flats, being built on the corner of Oxford & Sherbrooke Sts., at a cost of $21,000, for Mr. Burland.

The electrical work on the repairs to a $10,000 residence on Durocher St., Montreal, owned by the Catholic High School, has been secured by the Vincent & Say Electric Co.

Messrs. J. A. Anderson & Co., 205 Mansfield St., Montreal, have been awarded the electrical contract on an $11,000 garage being erected on Vallee & St. George Sts., for the Coca Cola Co.

The Sayer Electric Co., 47 Bleury St., Montreal, has secured the electrical contract on a bank building located at Bleury & St. Catherine Sts., Montreal, now being remodelled for the Dominion Bank of Canada.

Mr. J. A. St. Amour, 2171 St. Dennis St., Montreal, has secured the electrical contract on an apartment house to be erected on Dorchester St., near St. Mathieu, Montreal, at an estimated cost of $125,000, by Messrs. F. Tremblay & Company, 400 William St.

Ottawa, Ont.

The Bank Electric Co., Bank St., has been awarded the electrical contract on a residence costing $8,000 being erected on Clarence St., for Wolf Shenkman.

Mr. Wm. Hoffman, Westboro P. Q., has been awarded the electrical contract on three residences, value $13,000, being erected on McLeod St., for R. Maxwell, Ottawa.

The electrical contract on a residence being erected on Bronson Ave., Ottawa, for R. W. White, 992 Bronson Ave. has been awarded to Mr. Davis, LeBreton St., Ottawa.

Mr. Fred Wilson, 128 McLeod St., Ottawa, Ont., has been awarded the contract for electrical work on a church to be erected at Bell & Somerset Sts., Ottawa, by St. Lukes Anglican Church, costing in the neighborhood of $50,000.

Rockland, Ont.

Work has just been started on an electric lighting system and dam for the Rockland Electric Light Co. The cost is estimated at $55,000.

Rockcliffe, Ont.

Mr. Stan. Lewis, 63 Metcalfe St., Ottawa, has been awarded the electrical contract on a $15,000 residence being erected in Rockliffe, Ont., for A. S. Sherwood.

St. Thomas, Ont.

The annual report of the St. Thomas Municipal Hydroelectric Department shows a surplus of $22,615. An amount equal to one month's bill was handed back to each customer from the accumulated surplus.

St. Lamberts, Que.

Mr. F. Matthews, 52 Elm St., St. Lamberts, Que., has just secured the contract for electrical wiring on a new residence recently erected for Mr. L. Juster, Birch Ave., St. Lamberts. Mr. Lambert also reports the installation of a number of electric ranges in different sections of the city.

St. Catharines, Ont.

Mr. F. Carley, 19 Jones St., St. Catharines, Ont., has been awarded the contract for electrical work on stores, office and lodge building, recently erected at 18 James St., St. Catharines, for Union Lodge I.O.O.F. No. 16, at an approximate cost of $70,000.

Sarnia, Ont.

The Chambers Electric Co., Sarnia, Ont., has been awarded the electrical contract on a church hall to be erected on George St., Sarnia, for the Central Methodist Church, at an estimated cost of $30,000.

Saskatoon, Sask.

The Electric Shop, Saskatoon, Sask., has secured the electrical contract on a College and School Home being erected on College St., Saskatoon, for the Presbyterian College, Saskatoon.

Sudbury, Ont.

Messrs. Grant & Hiscock, Sudbury, Ont., have been awarded the contract for electrical work on a parish hall to be erected on Ignatius St., Sudbury, for St. Ann's Church.

Thornhill, Ont.

Messrs. Matson & Co., Aurora, Ont., have secured the electrical contract on a $33,000 school being erected in Thornhill, for Markham & Vaughan Townships.

Toronto, Ont.

Mr. W. S. Clegg, 79 Blackthorne Ave., has been awarded the electrical contract on a $75,000 residence being erected on Weatherall St., Toronto, for J. Thompson.

Mr. J. W. Griffiths, 358 St. Johns Road, Toronto, has been awarded the electrical contract on two $7,500 residences being erected on Armadale Ave., Toronto, for Chas. H. Bentley.

Messrs. Moss & Stocks, 1145 Yonge St., Toronto, have been awarded the electrical contract on a $17,000 residence being erected on Teddington Park Ave., for Dr. E. I. Zinken, 26 College St., Toronto.

Messrs. Clegg Bros., 79 Blackthorne Ave., Toronto, have been awarded the contract for electrical work on ten residences to be erected at Willard & Ardagh Sts., Toronto, by Mr. A. W. Reid, 87 Pleasant Road.

Messrs. Richardson & Cross, 81 King St. E., Toronto, have been awarded the contract for electrical wiring on a church to be erected at Vaughan Road & Helena Ave., Toronto, at an estimated cost of $50,000.

Messrs. Gibson & Pearson, 61 Hatherley Road, Toronto, have secured the contract for electrical work on six residences being erected at Durie & Ardagh Sts., Toronto, by Mr. Stan. Walker, 536 Queen St., West.

Mr. George Armstrong, 1319 Ossington Ave., Toronto, has been awarded the contract for electrical work on stores and apartments to be erected on Armadale Ave. & Bloor St., Toronto, at a cost of approximately $30,000.

The Canada Gazette announces the incorporation of the Radio Pictures Corporation, Limited, with a capitalization of $250,000, to manufacture and deal in radio apparatus and to handle radio pictures, etc. Head office, Toronto.

Mr. William Dean, 146 Jarvis St., Toronto, has been awarded the contract for electrical work on a church and rectory to be erected on Roncesvalles Ave., Toronto, by the parish of St. Vincent de Paul, at an estimated cost of $125,000.

The Ontario Gazette announces the incorporation of the Donald F. Johnston Radio, Limited, with a capitalization of $40,000. The firm is authorized to manufacture and deal in radio and other electrical apparatus of all kinds. Head office, Toronto.

An issue of debentures to provide $2,500,000 of additional capital to the local Hydro-electric Commission was recently passed by the Board of Control, Toronto. These funds are required for extensions to the distribution system, and other improvements. $500,000 is to be set aside for an addition to the Public Utilities Building; $300,000 for copper for existing positive railway feeders, and provision is made for 14,000 new meters and 1,000 new street lights.

Vancouver, B. C.

Work has been started on the electrification of about three miles of railway tracks serving industries on Granville Island.

Windsor, Ont.

The electrical contract on a residence on Bruce Ave., Windsor, has been awarded to A. M. MacPherson, 128 Victoria Road.

Winnipeg, Man.

The Star Electrical Co., 185 Lombard St., Winnipeg, have been awarded the electrical contract on alterations costing $11,000 being made to a building on Main & Alexander Sts., Winnipeg, owned by the Hemphill Trade Schools, Limited.

The Manitoba Gazette announces the incorporation of John N. Lyon Limited, with a capitalization of $500,000. The new firm is authorized to manufacture and deal in electrical apparatus of all kinds. Head office, Winnipeg.

Electric Lighting Products Limited

Of interest to the lighting fixture trade throughout Canada, and especially to Toronto and Ontario dealers, is the recent formation of a new company, Electric Lighting Products, Limited, with office and showrooms at 149 Victoria St., Toronto, in the heart of the wholesale electrical district. This company, which is now open for business, will distribute an extensive line of high grade electric fixtures, marketing them solely through the fixture trade. Mr. G. W. Barber, for many years with McDonald & Willson, is managing director; Mr. H. M. VanGorder is sales representative serving the trade of Toronto, while Mr. I. Lewis will call upon out-of-town dealers. In addition to popular stock lines, this company is equipped to handle through dealers all fixture work of a special nature, such as for churches, schools, public buildings, etc. A complete line of fixture sundries, glassware and lamps will also be carried. All members of the trade are cordially invited to visit the display rooms and will join in wishing the new company a large measure of success.

Order for Steel Furnace

The Volta Manufacturing Company, of Welland, Ont., Canada, have recently booked an order from Renton & Fisher, Limited, of the Hopetown Steel Works, Bathgate Scotland, for one of their standard 3-ton capacity Heroult type electric steel furnaces, with transformer and switchboard equipment complete. The Volta Manufacturing Company, also build the "Duplex-Voltage" or "Quick-Melting" type of furnaces for melting steel and grey iron, as well as three-phase furnaces, of an improved design, for melting brass, aluminum, etc. Some of their more recent developments include electric annealing furnaces, electric core baking ovens, electric soldering iron heaters, electric babbitt heaters, electric water heaters, etc.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Pacific Coast Government Inspector and Engineer Favors Standardization of Wiring and Appliances

Mr. T. Muirhead, Inspector of Electrical Energy for the province of British Columbia, has been spending a couple of weeks in Ontario, getting acquainted with conditions there as regards approval and inspection of electrical wiring and appliances. Mr. Muirhead's office is unique in Canada, as he has oversight over all outdoor as well as interior wiring and equipment. He is also electrical engineer to the local government and in the dual capacity has gained very extensive experience of the requirements of the industry.

It is therefore of special interest to note that in British Columbia they are having the same difficulty due to cheap wiring jobs and cheap goods as they are in some of the other provinces and that Mr. Muirhead is entirely in accord with the movement for a standard of installation work as well as of electrical equipment and appliances. He is responsible for the introduction of a licensing act for contractors and journeymen in the B. C. Legislature, which as in Ontario, is still hanging fire, but is likely to be reconsidered next session. He is also of the opinion that, although there may be some difficulty in arriving at an absolute standard, there should be little difficulty in reaching a satisfactory working arrangement so that the needs of the industry may be served.

The electrical industry is, in a sense, a paradox. Though admittedly a prime factor in providing relief for human ills there is also associated with its use a very considerable hazard. Where the electrical hazard is prominent its effectiveness in providing relief is minimized. It is thus essential that we do everything in our power to make the use of electricity safe and foolproof and, to this end, the men who instal equipment must be capable and dependable, while the equipment itself must be of the highest grade. Public safety demands a legalized safe standard in both.

Ontario Hydro-Electric Commission Issue Report on Nipigon Plant

The Hydro-electric Power Commission of the Province of Ontario have just issued an interesting report on the Nipigon development, which is located near Fort William and Port Arthur in what is known as the Thunder Bay District. The booklet deals with the natural resources of this district, the rapid growth in demand for electric power and the pressure brought by the municipalities, upon the Commission, to provide an adequate supply so that future needs may be taken care of. The various power interests in the neighborhood are described in some detail and reasons advanced for the choice of Cameron Falls on the Nipigon River where 50,000 h.p. is available. The Dog Lake development, or Silver Falls, as it is sometimes called, was not favored on account of its less limited capacity, this matter being summed up in the following paragraph:—

"The studies made by the Hydro-electric Power Commission led to the conclusion that the cost of developing even 30,000 h.p. at unity load factor on the Nipigon River, would be but little greater than the cost of making a similar development at the Dog Lake site. And, moreover, the Nipigon development would be capable of future enlargement to take care of larger power requirements than would be the case with the Dog Lake Development, limited as it is to an ultimate development of from 18,000 h.p. at unity load factor to 30,000 h.p.

The Commission has been criticized on two scores, and this report deals with both: (1.) It has been said that the contract should have been renewed with the Kaministiquia Power Co. (2.) The Nipigon development has been criticized on the score of cost, which makes the power rate greater than would have been available under contract with the Kaministiquia Company. In connection with (1.), the report claims that the power survey made by the Commission established beyond question that the Commission was correct, not only in its appraisement of the power demands of the near future for the Thunder Bay District, but also in its conclusion that these demands could not be met by the Kaministiquia Power Co. from its present site. As regards (2.), it is admitted that the cost of the Nipigon plant as on January 13-31, 1922, is about a million and three-quarters greater than the estimated cost in 1919, but in extenuation it is stated that the date of starting the work was delayed, which meant that when finally started, it had to be rushed at extra expense; that the cost of labor required for the construction of the plant increased approximately 46.5%, totalling for the whole job about $1,350,000. and that the cost of materials used in the plant increased approximately $600,000 over the cost prevailing at the time the estimate was made.

Chapter 2 deals with the advantage of Hydro-electric Power at low rates supplying extensive and expanding markets, and Chapter 3 covers in some detail the natural advantages of the twin cities of Port Arthur and Fort William. An appendix contains a brief description of the hydro-electric development itself.

Winnipeg Power Lines and Distribution System Crippled by Severe Wind Storm

Electrical services once again suffered an interruption due to a terrific wind storm that hit the city about 3 a.m. on June 23rd. A great amount of damage was done to buildings in the city and surrounding country, several lives being lost. The transmission lines of the Winnipeg Hydro and the Winnipeg Electric Co. were again crippled, the street railway lines especially suffering damage to the extent of 42 towers being levelled to the ground at Lydia, which place had just recovered from the effects of the previous storm. The Winnipeg Hydro line was hit about 20 miles away from the breakdown experienced at Milner, Tyndall district being picked out by King Boreas for its share of the damage. Fortunately the Hydro towers were only down on one of the transmission lines, the other line remaining intact with the exception of the circuit being blown from the insulators in several places. On No. 2 line a number of towers were levelled to the ground although only four were crippled; consequently, the work of re-building will not be as difficult as the first reports indicated. Owing to the extensive damage in the city to the distribution system, service was withheld until 5: 45 P. M. in order to give the line gangs every opportunity of making safe the wires which were lying about in all directions. With the exception of some of the outlying districts and isolated cases normal service was restored by the following morning. The Winnipeg Electric Railway lines were badly hit owing to the large number of towers they had down and also trouble at the standby plant; consequently it was only possible to render a limited service until Sunday morning when a temporary circuit on the transmission line was put into operation. Never in the history of the two power services in Winnipeg have they experienced such climatic conditions as they have had this year, and it has naturally brought the question of a standby plant for the Winnipeg Hydro once again to the fore and every effort is being taken to have the work speeded up. However, it is pointed out that even if a standby plant had been in existence at this time only a very limited service could have been given owing to the badly crippled state of the distribution system. In addition to the damage in Winnipeg the surrounding country in Western Manitoba, suffered severely, especially the town of Portage La Prairie where a great deal of damage was done by wind and fire, three of the large flour mills being practically destroyed. In addition, the transmission between Winnipeg and Portage La Prairie was blown down for a considerable distance.

Feed line wrecked by storm—McPhillips street, Winnipeg

School Children and Safety

About April 1st, the Ontario Safety League announced a competition for the best essays by school children in the Province of Ontario, on the subject "How Children May Help to Avoid Motor Accidents." Cash prizes amounting to $200. in all were donated by the Ontario Motor League. This amount was divided into one hundred and forty prizes, varying in value from ten to one dollar in order to give, as far as possible, equal chances to all. The prizes were divided into two classes—

Class A, for children 12 years and under.

Class B, for children 13 years and over.

Many lives are lost every year on account of reckless driving, and thoughtlessness on the part of pedestrians, and experience has shown us that accidents involving automobiles and children can be materially reduced by teaching children how accidents are caused and how they should be avoided.

Annually, for a number of years, the Ontario Motor League has been donating money for these essay competitions. Up to this year six hundred has been the largest number of essays received in any one year. It is therefore very gratifying this year to have received 2,600 essays in competition for these prizes. Not only is this gratifying, but it is a matter of congratulation that a number of towns in Ontario, and a number of schools, who have never competed before, have this year entered the competition.

Steam Stand-by for Winnipeg

Considerable discussion is going on in Winnipeg in connection with combining a central steam heating plant with the proposed Hydro standby plant. It is thought that owing to the long winters this city is admirably suited for the establishment of a central steam heating plant. These have been in operation on the Pacific Coast for some years in such cities as Seattle and Spokane. A proposition was put forward some years ago by a company who requested a franchise from the city for the privilege of operating a steam heating plant. Owing to financial conditions, however, nothing was done. Included in this proposal was an offer made to the city to sell them a standby service for the Hydro Department. This covered the use of a block of power of about 10,000 h.p. capacity in case of a break-down in the hydro-electric service. The city, however, is now committed to the building of a standby plant of its own and is therefore no longer interested in such a proposal. However, there are certain features of the central heating scheme which are worth consideration and it might be possible to plan the standby plant so that a central heating scheme could be embodied with it at a later date.

Our Apologies

In the report of the C. E. A. convention in our July 1 issue we referred to the representative of the N. E. L. A. as Mr. Whonken. This was a typographical error and should have read Mr. W. H. Onken.

Our report of new officers also mentioned a first, second and third vice-president. We are advised that the constitution has been amended in this respect and that all the vice-presidents, i.e., Messrs. Doddridge, Pratt and Beaumont, have the same standing.

On July 7, the Royal Mail liner Orbita was successfully navigated through a narrow channel leading to Portsmouth harbor by electrical signals from the Admiralty's submarine cable laid twenty miles out to sea with the object of lessening the fog peril near the harbor. The Orbita up to the present time is the only ship on which the necessary equipment has been installed.

Successful Midsummer Convention of Ontario's Hydro Engineers

Niagara Falls an Ideal Location for a Judicious Admixture of Business and Sociability

The Association of Municipal Electrical Utilities holds two conventions each year—one in midwinter, generally in Toronto, and one in the summer, which so far has always been held at Niagara Falls, partly on account of the natural lure of the place and partly, doubtless, that the delegates may have an opportunity of looking over the Chippawa-Queenston development plant which is always a feature of the midsummer convention. These conventions are very fully attended, representatives being present from practically every municipallity where the Hydro operates. In a number of cases the commissioners attend as well as the engineers. In point of attendance this year's convention, held in the Clifton House on the 22nd, 23rd and 24th of June, was no exception.

A. M. E. U. conventions are a good deal like other functions except, perhaps, in the one feature that they never try to crowd too many items on the programme. Time is allowed for discussion, for sociability and for entertainment. Following the address of the president, Mr. M. J. McHenry, of Walkerville, and the report of the secretary, S. R. A. Clement, and the treasurer, G. J. Mickler, the first ray's proceedings consisted largely of an address by Dr. Hastings, Toronto's Medical Health Officer. The doctor's lecture was interesting as well as delightful and in the discussions that followed the delegates were very loath to leave a subject that possessed so much of interest for all of them.

Friday's proceedings consisted in the reading of papers by R. C. McCollum on "Some Peculiar Phases of Allocation of Charges for Municipal Electrical Utilities;" by M. B. Hastings on "Modern Street Lighting from Construction and Apparatus Standpoint," and by R. M. Love on "Modern Street Lighting from Illumination Standpoint." Mr. Wills Maclachlan spoke in the interests of the consistent use of safety devices and steady practice in life-saving exercises. Mr. K. A. McIntyre also spoke in the interests of the Society for Electrical Development, of which he is the Canadian representative.

Convention Dinner

The A.M.E.U. programme always includes one get-together dinner, of which one of the chief characteristics is its freedom from formality. Everybody attends and everybody enjoys himself. This dinner is unique in many ways and is only made possible by the fact that the members of the Association know one another thoroughly, and in many cases intimately, so that the function takes on the appearance of a reunion. A number of the delegates have very fine voices and these were much in evidence during the evening. The dinner was followed by a number of excellent addresses, among the speakers being Hon. I. B. Lucas, Commissioner Ellis of Hamilton and others.

Contractor-Dealers in Attendance

It had been arranged for the Contractor-Dealers' Association of Ontario to hold an executive meeting in Niagara Falls at the same time so as to meet with the central station men, and the presence of Mr. McIntyre the first president of the Association, was taken advantage of by the members of the Executive to make him a little presentation. As a result there now hangs from his waistcoat pocket a very handsome watch fob, suitably inscribed. Simultaneously, it was announced, a bouquet of flowers was being delivered to Mrs. McIntyre in Toronto. The presentation was made by Mr. Harry Hicks, the present president of the Ontario Association of Electrical Contractors and Dealers.

Friday Afternoon's Session

Friday's business concluded, the delegates repaired to the baseball grounds where the Hydros battled with the Commercials. The Convention Bulletin reports the score 127 to 121 in favor of the Hydros, and incidentally, we want to add our word of congratulation to the Editor-in-Chief and his assistants of this Bulletin who so successfully, under great difficulties, got out a four-page printed folder on both Friday morning and Saturday morning. The responsibility of this work fell largely, we understand, on the shoulders of Mr. J. E. B. Phelps, with Charlie Hopper as first assistant. The items printed were of real interest. They included a list of the members registered, and a number of very snappy short articles one of which was entitled "The Famous Fishing Trip," written, we understand, by three prominent members of the fishing party no one of whom had any knowledge that the others were also writing the story. As a consequence the versions did not check up at every point. On the whole it may be said, however, that the three stories constitute a very complete, if contradictory, report of what must have been—to look back upon—a very interesting vacation.

On Friday evening the delegates were left to follow their own inclinations—which led in various directions. Saturday morning was taken up with an inspection of the canal and the new power house where the two 55,000 h.p. units are now operating. Next year when they meet in June and make the same trip it will probably be five.

Manufacturers' Exhibits

The exhibit of manufacturers' equipment was unusually attractive. The following firms were represented:

Packard Electric Company; Hoover Suction Sweeper Company; Moffat's Limited; Canadian General Electric Company; Easy Washing Machine Company; Standard Underground Cable Company; National Electric Heating Company; Ferranti Meter & Transformer Company; McClary Manufacturing Company; Canadian Edison Appliance Company; Chamberlain & Hookham Meter Company; Square "D" Company; Winter-Joyner Limited; N. Slater Company; Mr. H. E. Timmerman; Robbins and Myers Limited; Addressograph Company; Canadian Westinghouse Company; Mr. Hustwitt; Nineteen Hundred Washer Company; Sangamo Electric Company; Brantford Washing Machine Company.

If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Some Peculiar Phases of Allocation of Charges for Municipal Electrical Utilities

By R. C. McCOLLUM*
Auditor Hydro-electric Power Commission of Ontario

When the Uniform Accounting System for Municipal Electric Utilities was issued in 1912 and revised in 1915 it was essentially an adaptation of the accounting systems which had been practically standardized by the Interstate Commerce Commission of the United States and by the most prominent of the Public Utility Commissions at that time, notably New York and Wisconsin.

These systems came into being simultaneously with the demand for some sort of control over the rates charged by private companies for service dependent to some extent on franchises granting the right to use the public streets and the practical elimination of competition, a condition lending itself very readily to extortion and discrimination, with no right of redress or method of relief.

Laws were passed in various States and by the Federal Government at Washington placing some measure of control of rates in the hands of Public Utility Commissions, which were empowered to hear evidence, study operating reports and statistics and finally order rate revisions.

The first essential to the intelligent operation of such a Commission was a standard or uniform accounting system by which balance sheets and operating reports of operating companies could be compared, and the improper loading of expenses more readily detected, and the result was the evolution of a uniform accounting system so clearly and precisely outlining a reasonable and rational practice, and so clearly adhering to the unalterable laws of economics, that except in the choice of language all of the accounting systems of which I have knowledge are practically similar and interchangeable.

Protection of Consumers

It will be noted from the above that the Uniform Accounting Systems were evolved primarily for the protection of the consumers rather than the owners of the utilities concerned, and it was but logical that the Hydro-Electric Power Commission, acting as the agent or trustee for the municipalities and through them, the consumers, should have adopted the Accounting System as already developed for privately owned utilities, making such modifications as were necessary to eliminate returns on capital stock and at the same time provide for the amortization of the plant cost by means of the annual principal and sinking fund payments on debentures.

However, the working value of an accounting system, embodying as it does the best collective judgment of many practical and experienced engineers and accountants, was quickly realized by all large public service companies, who no doubt would have adopted some uniform accounting system for their own protection long ago, quite regardless of governmental regulations.

Most of you are already familiar with the Commission's "Uniform Accounting for Municipal Electric Utilities" and the method followed of dividing it into three sections to permit a practical application of identical principles to large, medium and small municipalities, and while in each case the text is plain and understandable to the average reader, its use presupposes a working knowledge of practical bookkeeping. As in everything else in life, knowing how a thing should be done, and being able to do it, are two very different things.

An Effective System

The function of any accounting system is to reflect or mirror in a form so condensed that it will make a clearcut impression on the human mind, the cost of a plant, the money value of same, the financial result of operation of the plant for definite periods and the cumulative result of operation to date. All effective accounting systems must do this, and refinements or subdivisions are added according to the desire of the management for detailed analysis.

As an illustration, a man might build himself a house, paying all the bills as they came in from a special bank account, and when the house is finished his bank balance will show the cost to have been, say, $5,000.00. This may answer all his needs for the present, but if he undertakes to build another, he cannot plan as intelligently or efficiently as his neighbor who knows just how much of his $5,000.00 house is represented by excavation, masonry, rough lumber, finishing lumber, hardwood floors, roofing, heating, plumbing and painting, etc., nor can the young couple who face embarrassment in meeting a monthly living expense of $125.00 out of a $100.00 income set their finances in order until their expenses are so analyzed that essentials and luxuries can be definitely determined and retrenchment intelligently planned. The same rules are equally applicable to big business—we should know, the Bacon's observation that "a little knowledge is a dangerous thing" is as truly applicable to bookkeeping or accounting as to everything else.

Briefly stated, all expenditures fall naturally into four principal divisions:

1. Plant or Capital;
2. Maintenance and Renewals;
3. Operation and Administration;
4. Interest and Debenture Payments.

In addition to the actual money expenditures enumerated above, a provision is made for providing revenue from the date a plant becomes alive to replace or restore each unit making up the plant, when it becomes economically irreparable, and in actual practice this has been assumed to include obsolescence as well.

The general rule governing the allocation of capital is simple—embracing all items having an expectant life of more than one year, and the rule governing proper maintenance is equally simple at first, but the complications which finally develop in the handling of the accounts when a distribution system is being rebuilt to accommodate a change in load, and when the maintenance accounts are taking care of actual renewals or replacements, can be realized only by those actually in charge of such work.

What the Accounts Should Show

I said above that the accounts should show the plant cost and its money value. These are by no means synonomous things, but it is a more or less neglected factor in many private companies as well as in practically all municipal utilities, and the relations between the two in theory are continually in a state of flux. Tangible values should always be segregated from intangibles, but the total of the two should show the total outlay on capital. Plants may be abandoned, by reason of obsolescence or change in load, and where this is done, the cost should be taken out of active capital and carried in an obsolescent plant account. Pole lines may be taken down, and even if the material is salvaged, the labor erecting and demolishing is no longer tangible property, and except in unusual cases where there is special revenue to set against such cost, the amount should be still carried as intangible capital. The charging of such items to expense is unfair to the consumers of that year, destroys the continuity of the operating record, and especially in municipal systems where rates are yearly adjusted on a cost basis is demoralizing.

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*Before A.M.E.U. Convention.

We will consider, first, the case of a distribution system designed to provide for a normal balanced lighting and power load, which after a few year's use, in order to provide for several large power customers, has to be practically rebuilt. Granting that most of the material can be used, all of the labor in the original construction and in dismantling no longer represent value, and should in theory be eliminated from tangible capital, and other material, such as crossarms, while still good for some year's service, is discarded as not justifying the labor of replacing for its short remaining life.

Under no circumstances can we justify a maintenance charge against revenue of more than twelve months' ordinary wear and tear when full theoretical depreciation is also being provided for, so that it would appear quite logical and about the only practicable plan to allow original labor and overhead to remain in capital, capitalize so much of the new material and labor as went to increase the capacity of the plant, as nearly as can be determined, and charge the balance to the Depreciation Reserve, even up to the point of its entire depletion. Such a plant being practically new, can stand in the balance sheet without much accumulated reserve and not be subject to particular criticism. In actual practice, however, it will be found that no hard and fast rule can be adhered to, and as is so often the case, good common sense must govern.

Renewals

Under the classification the consumers are required to provide out to revenue for the current maintenance of the plant, and also for the ultimate replacement of each unit. An average rate has been set for this based on the average economic life of the various units of the plant, but so far no account has been taken of the increased life due to maintenance. For instance, a meter having a life expectancy of twenty years is rejuvenated periodically by cleaning, oiling and possibly the replacing of jewels and coils, so that its actual life far exceeds the estimate. A pole taken into account on a twelve year life basis may, and in cities and towns with proper drainage, usually does complete a life of more than double that time, or it may be cut and reset in a different location with an additional life of many years.

Experts Prove Anything

In a general way plant life expectancy on which depreciation rates are computed, is based on evidence of so-called experts before Public Utility Commissions in rate adjustment hearings, when it is to the interest of the private companies to justify high rates by proving rapid depreciation of plant. We have probably all observed in recent hearings in which we have more than a passing interest, that any contention can be proven by the testimony of experts. At any event, the burden of proof that the figures submitted by the experts were extravagant has always been on the Commissions, with the result that they usually allowed the benefit of the doubt, and the official records may be reasonably considered as ultra conservative.

The result of all these conditions is that our authorized depreciation rates normally build up an adequate reserve long before the time when actual replacement becomes necessary and to prevent an unfair loading of expense against revenue, the actual maintenance expenditures should be carefully scrutinized, and that part of the expenditure which extends the life of the units affected should be charged against the Reserve, leaving in maintenance only a normal twelve months' wear and tear. This also is largely a matter of good judgment and common sense, taking the conservative position in case of doubt.

No Labor Charge

There is another factor which has a very important bearing on this matter in the average Hydro Municipality, excepting only the very largest and smallest places, and that is that ordinarily all extensions to plant and all renewals of same are made without labor charge and include only the bare cost of the material. The reason for this is that in the average municipality there is an irreducible minimum of staff who are charged to the third general heading, "Operation and Administration," and the normal extensions to the plant and maintenance work are taken care of incidentally without additional expense by the operating staff, who are indispensable regardless of such work. As a matter of fact, excepting only the very large and very small places where men are engaged specifically for this work, there has been practically no labor incorporated in the cost of additions which have been made to the municipal plants since the systems were first made alive.

Assuming that on the average about 50% of the cost of the original plant consists of labor, it follows that as no additional labor is required when replacement is made, the ordinary depreciation rate so far as it applies to the original plan, is about twice the actual requirement, or what it need be.

In the operation of an electric utility or a telephone system, made up of a large number of relatively small units, there is a point beyond which actual depreciation cannot go and the plant give satisfactory service. Renewals of small parts, automatically charged to maintenance, and the constant addition of new material in extensions, tend to retard, and at some point definitely arrest the progress of depreciation. In a recent hearing where the rates of the New York Telephone Company were under revision the New York Public Utility Commission, 1st Division, a body whose judgment will be respected by all other similar bodies, recently ruled that thirty per cent. of the tangible depreciable plant value was the maximum depreciation reserve that could be justified in a balance sheet. This closely follows the evidence given in the recent hearing of the application of the Bell Telephone Company at Ottawa for an increase in rates, when their application was refused by the Dominion Railway Board.

Depreciation Fund Too Large

In many Hydro municipalities the accumulation of depreciation reserve in less than ten years' operation already approximates this percentage, and if we add the free surplus, frequently exceeds it, and it is altogether likely that before long the depreciation rates will either be revised downwards or a maximum fixed which will have the same effect.

In one important essential the requirements of the accounting systems governing the operation of the Hydro-Electric Power Commission and the Hydro utilities differ from those controlling private companies in that they include as an operating charge the principal and sinking fund payments on the debentures, which a private company never does, and remember, when making comparisons with prices quoted by private companies, that you are automatically acquiring complete ownership of the generation, transmission and distribution system. In many municipalities a debt free local plant is already in sight and the balance is a matter of mathematical calculation. There is some satisfaction in planning such a heritage for our children.

The accounting system is in its way as essential to the success of the Hydro as the supply of energy, because its economic success is dependent on an accurate knowledge of what is taking place. Every Commissioner, Manager, Secretary or Representative of a Hydro utility in any capacity should have a general understanding of the principles of the accounting system, and should be so familiar with the municipal section of the annual report that he can obtain from it without effort, any knowledge he requires for his own information or for the benefit of his friends.

If you have a reasonable question about your operation, the answer should be in this book. If it is not, make it your business to find out why.

Discussion on Mr. McCollum's Paper

The discussion on Mr. McCollum's paper was largely around the matter of reserves. Mr. Ireland led off by remarking that he did not see the necessity for the present generation both paying for the plant and also providing a fund with which to buy a second plant. If we paid for the plant and handed it over to the next generation in a proper state of maintenance, posterity should think themselves well treated. In any case he did not see that we were called upon to build up a reserve of more than 30 to 50% of the replacement value of the plant. A number of the delegates expressed similar opinions on this point, the majority of them not favoring building up a replacement reserve.

Report of the Various Sub-Committees of the Merchandising Committee

By G. J. MICKLER*

At a joint meeting of Inside and Outside Merchandising Committees held on January 25th, 1922, at the Offices of the H.E.P.C. there were formed four Sub-Committees as follows:—Purchasing Committee; Educational & Advertising Committee; Servicing Committee; Accounting & Collections Committee; and each of these Committees was instructed to look into the problem of furthering the interests of the Hydro Municipalities in merchandising matters, and to submit suggestions for properly conducting the Merchandising Campaign. Following this Meeting the Purchasing Committee met on January 26th, and it was decided to obtain from all Municipalities selling merchandise, a Specification of their sales for the year 1921, as well as a schedule of the probable sales for 1922, upon which could be based an estimate of the probable total requirements of all Hydro Municipalities for this year. In response to an appeal to the Hydro Shops for this information all but one or two sent in the information, which was compiled and used as a basis for further consideration of the problem of buying supplies for Hydro Shops through the Purchasing Committee.

The Purchasing Committee held a Meeting on April 20th, and were presented with the compiled list of Specifications for the Hydro Shops for the year 1922, and discussed ways and means of approaching manufacturers of the various appliances manufactured and supplied, with a view to obtaining the very best prices on the amount of business set out in the schedule. After thoroughly discussing the problems confronting them, it was decided to leave the matter to the Purchasing Department, in whose hands the question of obtaining prices still stands. Before overtures could be made to the manufacturers, some definite plan governing the merchandising activities of the H.E.P.C. was necessary, and bearing this in mind a Meeting was called of the Educational Committee, to discuss the proper methods of conducting an Advertising and Educational Campaign in Ontario.

The Chairman of the Educational Committee submitted a detailed Report of suggestions as to the proper way of conducting an Educational Campaign and with these suggestions several advertising agencies were approached and asked to submit propositions along with the probable cost of Campaigns to cover the Hydro requirements. Two such propositions are at present under consideration, and should they meet with the approval of the Commission, the Municipalities will be notified in due course of their complete operation, and the co-operation of all Municipalities in carrying out the plans is earnestly asked for.

The Servicing Committee held a Meeting on January 26th, and discussed the principles which should govern the servicing of appliances in the Hydro Municipalities. The deliberations of this Committee are not quite complete and when the full programme has been definitely decided on, it will be presented in the form of a pamphlet for reference to every Hydro Shop.

The Accounting and Collections Committee have not yet held a Meeting, but information has been collected on accounting methods employed in Hydro Shops and in similar lines elsewhere, with a view to getting the best that could be had for the purpose, and Accounting Systems to take care of the Merchandise Departments were installed in a number of municipalities along these lines as a trial, after the operation of which, it is expected printed instructions will be issued to the Hydro Shops, to carry on their Accounting in this way.

Discussion

One of the delegates inquired "What is the nature of the articles which the different Hydro shops merchandise, and do they intend to extend the list and embrace more articles than they have to-day, and also are they in competition with other jobbers?"

Mr. Mickler: "Up to the present time, the Hydro Commission has taken it upon themselves to sell to municipalities whatever the municipalities require. So far as I know, every electrical appliance that is manufactured is within the scope of the Commission's activities. So far as the second part of the question is concerned, we are in active competition with jobbers, but not with manufacturers."

Engine Driven Welding Equipment

An engine driven welding equipment for use where electric power for motor drive is not available and for job welders who must work in widely scattered districts has been developed by the Westinghouse Electric & Manufacturing Company. This apparatus, which is made in stationary and portable models, also has the advantage of making it unnecessary to waste time applying for a permit or making proper connections before work can be started. The equipment consists of a Westinghouse single operator welding generator geared to a Doman four cycle, two cylinder, low speed, marine type gasoline engine. The generator is direct current, has a rated capacity of 175 amperes, and a maximum capacity of 225 amperes, at 1,750 r.p.m. The generator is designed to operate at arc voltage, and to inherently stabilize the arc and supply a substantially constant current of different values over the working range of 90 to 225 amperes. The operating characteristics of the generator are such that it is easy for the operator to strike and maintain the arc, and also to obtain the deep penetration and thorough fusion necessary for satisfactory welding. The shaft of the generator extends through the pedestal bearing and is connected by means of a flexible coupling to the exciter.

The control panel is mounted directly over the generator on a rigid, light weight angle iron frame work, and the entire equipment is mounted on a substantial cast iron bedplate.

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*Treasurer, A.M.E.U.

The Application of Electricity in the Manufacturing Industry---3

A Review of the Pulp and Paper Resources of Canada With Special Reference to the Utilization of Our Water Powers

The manufacture of pulp and paper is one of Canada's outstanding industries and the normal progress during the past few years is an indication of the rapid expansion which may be expected in the future. According to the Bureau of Statistics figures for 1920 the pulp and paper industry in Canada represented a total capital investment of $347,553,333, found employment for 31,298 persons whose yearly wages and salaries amounted to $45,253,893, while the value of the products totalled $214,421,546. The export trade of $120 in 1890 for this industry is often contrasted with the present corresponding figure of over $100,000,000, to demonstrate the remarkable expansion during this period.

The Importance of Cheap Power

The question of motive power in connection with the production of pulp and paper is a most vital one and, in fact, is almost as important as that of raw material. In any industry the relative necessity of obtaining cheap and adequate power may be gauged by the amount required per dollar of product and with the possible exception of certain electro-chemical and metallurgical processes, the requirements for pulp and paper are among the highest. The importance of cheap power may be judged from the fact that it takes practically 100 h.p. to make a ton of paper per day. It is, therefore, little surprising that motive power used in this industry is practically restricted to hydraulic energy and Canada's supremacy in the pulp and paper field rests on adequate and abundant water powers well distributed among extensive forest resources.

A few general details are here given to show how this large amount of power is consumed in the operation of pulp and paper mills. Average figures in connection with a large Canadian mill show that mechanical pulp requires 73 h.p. per ton of daily output of which 67 h.p. is for grinding alone; sulphate pulp requires 8.7 h.p. per ton of daily output, and in other large mills as high as from 20 to 30 h.p., while the production of newsprint from pulp consumes 12 h.p. for the same unit output. Continuous operation of mills in this industry, usually 24 hours per day, permits a very advantageous use of the necessary power and with direct water power or hydro-electric energy further allows a cheap unit cost for the amount consumed. For instance, one of our Canadian sulphite mills with an installation of 1,500 h.p., purchases hydro-electric power on the basis of $1 per h.p. per month plus a consumption charge on a sliding scale, and it was found that the minimum rate of 0.1 cent per kw.h. could be taken advantage of for about 75 per cent of the total consumption, thus reducing their unit power cost very materially.

Water Power Installations for Pulp and Paper Industry

In view of the very prominent place which the pulp and paper industry has acquired in Canada and further, of the important part which our water power resources are playing in the development of this field, the Dominion Water Power Branch recently undertook a special study in this connection and has gathered much information on power installation and requirements at pulp and paper mills operated by water power or by purchased hydro-electric energy. For the sake of brevity the general term "pulp and paper mills" has been adopted throughout this review and in the tables as including **pulp** mills, **pulp and paper** mills, and **paper** mills. The principal power and other features are presented in tabular form.

The water-power installation for the operation of pulp and paper mills in Canada aggregates 476,503 h.p. while the additional hydro-electric energy purchased for this industry is 160,577 h.p., giving a total of 637,080 h.p. This covers the energy derived directly or indirectly from water power but does not include mills where steam only is used as motive power. The use of steam as a source of power in this industry is very limited and in most cases is prompted by special conditions such as operation in close connection with the manufacture of lumber when refuse from the latter can be used as fuel under the boilers. The census returns (1920) show a total steam power installation in pulp and paper mills in the Dominion of only 62,400 h.p. and if the capacity of the three or four larger steam operated mills where special conditions obtain is excluded, the remaining unit capacity works out to a very small amount.

Electric drive is an important consideration in this industry. Of the total water-power installation for the various mills a total of 178,911 h.p. is converted into electrical energy before it is used to operate the pulp and paper machinery. The advantages of electric drive are numerous; a uniform speed is assured which is of primary importance in governing the quality of the product; it also allows the centralized operation of a large mill receiving power from several hydro-electric sources while a closer study of power conditions, adjustment and consumption is permitted. A well known authority on pulp and paper mill operation in Canada recently stated that the proper way to build a paper mill was to develop the power as a hydro-electric project and locate the mill at a place most suitable from the operating and shipping point of view, adding that the time for direct connecting of turbines to grinders was past.

Water Power Installation at each Mill

Table No. I presents a complete list of pulp and paper mills in Canada operated by water power showing the principal features in connection with the motive power installation. Column 1 gives the name of the owner or company operating the mill. The name of the river from which power is obtained is shown under Column 2, and the location is given in Column 3, while the head of water utilized in the development is given under Column 4. The number of turbine units installed to operate the mill and their total capacity, given in Columns 5 and 6, bring out the principal points in connection with power requirements of the mill and give an idea of its importance while its efficient operation may also be judged from the average size of each turbine unit installed. A number of mills, while producing their own power, convert the whole or a portion of the latter to hydro-electric energy before using it throughout the mill; as this is an important feature in modern operation, mills where such conditions exist are marked (e). There are a number of cases where the hydro-electric power used at the mill is generated quite a distance from it, this practice being made possible through the ease with which the electric energy can be transmitted. In most instances, the pulp and paper mill is installed at a water-power site and when gradual expansion has necessitated additional motive power, another nearby hydraulic site has been developed and hydro-electric energy transmitted to the mill to permit centralized operation. In the Lake St. John district in Quebec province one of the large mills receives energy from two hydro-electric plants located a few miles away and operated by the same company in addition to the water power developed at the mill itself. In addition to the power produced for the particular purpose of operating the mill many pulp and paper organizations in Ontario and Quebec also purchase hydro-electric energy from outside sources and the installation given under Column 6 does not represent the full capacity required; these mills are marked (p) in the last column of the table, to show that energy is purchased.

Mills Operated from Purchased Energy

Table No. II gives a list of mills operated entirely from purchased hydro-electric energy. Mills purchasing power and appearing in Table I with the mark (p) have not been repeated in Table II. In this connection it may be mentioned that a few of the mills listed as purchasing power could practically be said to produce their own hydro-electric energy in cases where the power plant is almost exclusively used to supply the pulp and paper mill but is operated by a subsidiary or allied organization. On the other hand we find large power organizations supplying a considerable amount of power to the pulp and paper industry. In Quebec, the Shawinigan Water & Power Company and allied organizations supply some 80,000 h.p., while in Ontario, the Hydro-electric Power Commission and Toronto Power Company together supply some 55,000 h.p. for this purpose.

Characteristics of Geographic Groups

The location of the pulp and paper mills in Canada shows that they are grouped according to facilities for wood, power or transportation. The various mills of the same group show certain outstanding features with regard to power requirements as a result of the class of production which characterizes the group.

Table No. III has been prepared to illustrate predominating features in certain districts into which our Canadian mills may be arbitrarily grouped. Perhaps the greatest contrast exhibited in this table is between the class of mills found in the Niagara and Toronto, Eastern Ontario, Montreal and Quebec city groups, where a large number of mills (Column 2), whose average capacity is small (Column 6), produce much of the miscellaneous kinds of paper (Column 9), while the British Columbia and more northerly groups in Ontario and Quebec comprise mills of large capacity (Column 6), requiring much power to produce principally pulp and newsprint (Columns 7 and 8).

Motive Power by Provinces

The mode of producing power for the operation of pulp and paper mills is summarized in Table No. IV. While there is still a large amount of water power used to drive the mill equipment directly from turbines, a considerable portion is utilized by first converting it to hydro-electric energy for the more convenient electric motor drive. Column 7 of this table which is made up by adding Columns 4 and 6 gives the total hydro-electric energy, including that purchased from outside sources, and a comparison of these figures with those of Column 3, representing direct drive from water power, shows that the two modes of operation are fairly evenly divided in British Columbia and Quebec; that electric drive predominates in Ontario and New Brunswick, while direct water-power drive is used almost entirely in Nova Scotia.

General Conditions in Each Province

A rapid inspection of the data in the various tables shows the province of Quebec slightly ahead of Ontario in the pulp and paper industry. British Columbia ranks next, followed by New Brunswick and Nova Scotia, while the industry has yet to be introduced in our prairie provinces.

QUEBEC

This province has 54 mills requiring a total of 312,867 h.p. either installed or purchased. The total daily producing capacity of these mills is some 3,000 tons of mechanical pulp, 1,500 tons of chemical pulp, 1,300 tons of newsprint, and 700 tons of other kinds of paper. There are naturally sveral large mills in this province where much energy is purchased or extensive water-power installations are required; the three largest are at Grand 'mere, where all the hydro-electric energy is purchased; Kenogami where power is obtained from two hydro-electric plants in addition to that produced at the mill; Shawinigan, where a portion of the power is purchased; each of these mills require some 25,000 h.p. or more. Other large mills requiring between 10,000 and 25,000 h.p. include those at Hull, East Angus Brompton, Chicoutimi, Clark City and Cap Magdelaine.

ONTARIO

Ontario has 41 mills where the installed or purchased power aggregates 242,746 h.p. These mills have a total daily producing capacity of some 2,000 tons of mechanical pulp, 1,100 tons of chemical pulp, 1,800 tons of newsprint, and 600 tons of other kinds of paper. The feature in this province is the Iroquois Falls mill requiring 52,000 h.p. including the energy transmitted from Twin Falls; another large mill is located at Ottawa with an installation of 28,789 h.p. Mills requiring between 10,000 and 20,000 h.p. are numerous and include those at Sault Ste. Marie, Espanola, Sturgeon Falls, Thorold, Fort Frances and Fort William.

BRITISH COLUMBIA

British Columbia has 5 mills operated by water power but they are all of fair size and require a total installation of 48,800 h.p. while their daily producing capacity is 390 tons of mechanical and 345 tons of chemical pulp, 445 tons of newsprint and 30 tons of other kinds of paper. The two large mills at Powell River and Ocean Falls have respective installations of 24,000 h.p. and 20,550 h.p.

NEW BRUNSWICK

This province only has 3 mills operated by water power with a total installation of 14,668 h.p. and a daily producing capacity of 30 tons of mechanical and 250 tons of chemical pulp.

NOVA SCOTIA

There are 10 mills operated by water power in this province but most of them are not large; their total installation aggregates 17,999 h.p. and their daily producing capacity is some 230 tons of mechanical pulp.

Future Power Requirements of Industry

A few words may be added regarding the future trend of the pulp and paper industry which should be of particular interest from a water-power point of view. Owing to the present financial depression no very great expansion need be immediately expected. A very realistic illustration of what should be expected when industrial conditions become normal was afforded by the pulp and paper boom of 1918 and 1919. A large number of projected undertakings were then investigated and many requests for information were received by Dominion Government organizations in possession of the desired data as in most cases the parties concerned did not care in what province the mills were to be established. It was a case of obtaining pulp wood and water power almost at any cost and anywhere within reason. While most of these projects did not materialize owing to subsequent financial and other conditions they revealed what conditions may be expected in the future development of the industry and demonstrated what an important part our northern water powers will be called upon to assume in this connection.

Table No. 1

Pulp and Pulp and Paper Mills in Canada Operated by Water Power.

	PLANT or MILL		Turbine Installation			
Owner or Company	River	Location	Head in Feet	No. of Units	Total H.P.	Foot Notes
1	2	3	4	5	6	7
BRITISH COLUMBIA						
Pacific Mills	Link	Ocean Falls	140	12	20,550	e
Whalen Pulp & Paper Mills	Swanson cr.	1 mi. from Swanson Bay	130	4	1,750	e
	Mill cr. and	Woodfibre	580	3	1,250	e
	Cedar cr.		1,100		950	
	Victoria lake	Port Alice	400	1	300	e
Powell R. Co., Ltd.	Powell	Powell	147	7	24,000	e
		Total	....		48,800	
ONTARIO						
Fort Frances Pulp & Paper Co.	Rainy	Fort Frances	28	9	18,000	e, b
Dryden Pulp & Paper Co.	Wabigoon	Dryden	45	2	1,800	e
The Spruce Falls Co.	Kapuskasing	Kapuskasing				a
Mattagami Pulp & Paper Co.	Mattagami	Smooth Rock Falls	36	3	9,350	e
Abitibi Power & Paper Co.	Abitibi	Iroquois Falls	41.5	14	28,000	e
	Abitibi	Twin Falls	60	4	24,000	e
Spanish River Pulp & Paper Mills	St. Marys	Sault Ste. Marie	18	12	14,400	
Spanish River Pulp & Paper Mills	Spanish	Espanola	63	8	15,820	e
Spanish River Pulp & Paper Mills	Sturgeon	Sturgeon Falls	36	11	13,390	e
Spanish River Pulp & Paper Mills	Sturgeon	10 mi. north of Sturgeon Falls	35	2	5,200	e
Provincial Paper Mills	Credit R.	Georgetown	12	1	65	p
Provincial Paper Mills	Credit R.	Georgetown	21	2	150	e, p
John Fisher & Son	Morden's cr.	Dundas	42	2	312	
Garden City Paper Mills	Old Welland Canal	St. Catharines	12	2	285	
Kinleith Paper Mills	Old Welland Canal	St. Catharines	21	2	605	p
Lincoln Paper Mills	Old Welland Canal	Merritton	18	4	639	
Lincoln Paper Mills	Old Welland Canal	Merritton	25	3	1,450	e
Riordon Co.	Old Welland Canal	Merritton	14	3	650	e, p
Provincial Paper Mills	Old Welland Canal	Thorold	14	2	1,040	e
Provincial Paper Mills	Old Welland Canal	Thorold	12	3	453	e
Beaver Wood Fibre Co.	Welland Canal	Thorold	22	2	680	p
Thorold Pulp Co.	Old Welland Canal	Thorold	12	5	614	
Canadian Paperboards Co.	Trent	Frankford	13	5	1,080	e, p
Miller Bros. Co.	Trent	4 mi. from Trenton	11	4	684	e
Belleville Paper Mills	Moira	Belleville	14	2	90	p
Strathcona Paper Co.	Napanee	Strathcona	8	2	153	p
Specialty Paper Mills	Napanee	Camden East	18	1	125	
The Bronson Co.	Ottawa	Ottawa	29	1	2,000	
J. R. Booth	Ottawa	Ottawa	30	13	28,789	e
Howard Smith Paper Mills	Cornwall canal	Cornwall	8	13	800	e, p
		Total	....		170,624	
QUEBEC						
Riordon Co.	Gordon cr.	Timiskaming	214	2	7,200	e
E. B. Eddy Co.	Ottawa	Hull	34	7	14,149	e
Jas. MacLaren Co.	Lievre	Buckingham	45	8	8,125	
J. C. Wilson	North	Lachute	18	9	1,200	
Rolland Paper Co.	North	St. Jerome	25	4	800	e
J. C. Wilson	North	St. Jerome	33		954	
Rolland Paper Co.	North	Ste. Adele	100	5	1,325	
Howard Smith Paper Mills	North	Beauharnois			300	p
Canadian Paperboard Co.	Lachine Canal	Montreal	9	2	180	e, p
J. R. Walker & Co.	Ottawa	Sault au Recollet	7		850	
Howard Smith Paper Mills	Lac Ouareau	Crabtree Mills	29	1	1,200	e
Alex. McArthur & Co.	L'Assomption	Joliette	12	3	275	p
Belgian Industrial Co.	St. Maurice	Shawinigan F.	140	20	17,910	p
Brown Corporation	St. Maurice	La Tuque	85	2	3,200	e
Dominion Paper Co.	Nicolet	Kingsey Falls	24	3	880	e
Lotbiniere Lumber Co.	Nicolet	Danville	57	5	1,680	e, p
Brompton Pulp & Paper Co.	St. Francois	East Angus	55	13	10,701	p
Brompton Pulp & Paper Co.	St. Francois	Bromptonville	30	9	10,316	e
Canada Paper Co.	St. Francois	Windsor Mills	15	15	5,025	p
Lake Megantic Pulp Co.	Chaudiere	Lake Megantic	20	5	1,550	
Rowland Ford & Son	Portneuf	Portneuf	22	3	450	e
Ru-Ber-Oid Felt Mfg. Co.	Portneuf	Portneuf			750	
Montreal Paper Ltd.	Portneuf	Portneuf Stn.	18		250	p
Joseph Ford & Co.	Portneuf	Portneuf Stn. (No. 1 Mill)	8			
Joseph Ford & Co.	Portneuf	Portneuf Stn. No. 2 Mill	15		250	p
Eastern Paper Co.	Portneuf	St. Basile	13	2	130	
Joseph Piche	Portneuf	St. Basile	8	1	75	
News Pulp & Paper Co.	Ste. Anne	St. Raymond	31	10	4,080	e
Donnacona Paper Co.	Jacques Cartier	Pont Rouge	65	1	1,000	
Bird & Son, Ltd.	Jacques Cartier	Pont Rouge	17	7	1,384	e

Table No. 1 (Continued)

Donnacona Paper Co.	Jacques Cartier	Donnacona	60	5	6,000	e, p
Henry Atkinson	Etchemin	St. Romuald	26	4	946	e
Henry Atkinson	Etchemin	St. Romuald	10	4	167	
Richard & Co.	Petit Pre	L'Ange Gardien	600		500	
La Cie de Pulpe de Chicoutimi	Ouiatchouan	Val Lalbert	254	4	7,300	
Quebec & Saguenay Pulp Co.	Little Peribonka	St. Amedee de Peribonka	22	5	1,500	e
Jonquiere Pulp Co.	Au Sable	Jonquiere	65	33	4,500	
Price Bros. & Co.	Au Sable	Kenogami	265	8	26,200	e
Price Bros. & Co.	Shipshaw	Ste. Anne de Chicoutimi	90	3	10,600	c, e
Price Bros. & Co.	Shipshaw	Chute aux Galets	101	2	17,600	c, e
La Cie de Pulpe de Chicoutimi	Chicoutimi	Chicoutimi	105	6	10,850	p
La Cie de Pulpe de Chicoutimi	Chicoutimi	Chicoutimi	85	6	9,350	p
Donahue Bros., Reg'd.	Murray Bay	Murray Bay	58	5	9,000	e
Wolf River Pulp & Paper Co.	Riviere du Loup	Riviere du Loup	75	3	3,160	
F. Flo Soucy	Riviere du Loup	Old Lake Road	40	2	800	
Price-Porritt Pulp & Paper Co.	Rimouski	Rimouski	52	2	3,150	e
Gulf Pulp & Paper Co.	Marguerite	Clark City	54	7	11,000	e
Great Eastern Paper Co.	Madeleine	Madeleine	102	2	5,600	e
			22			
		Total			224,412	
		NEW BRUNSWICK				
Fraser Companies, Ltd.	Madawaska	Edmundston	24	2	3,000	e
Bathurst Co., Ltd.	Nipisiquit	Grand Falls	110	2	9,000	e
St. George Pulp & Paper Co.	Magaguadavic	St. George	46	4	2,668	e
		Total			14,668	
		NOVA SCOTIA				
Sissiboo Pulp & Paper Co.	Sissiboo	Weymouth Falls	60	4	3,120	e
Clyde Pulp Co.	Clyde	Port Clyde	20	4	1,800	e
MacLeod Pulp & Paper Co.	Mersey	Rapid Falls	33	14	6,024	
MacLeod Pulp & Paper Co.	Mersey	Cowie Falls	22			
Panstock Corporation	Medway	Harmony Mills	38	2	2 250	e
Nova Scotia Wood Pulp & Paper Co.	Medway	Mill Village	18	3	1,625	
La Have Pulp Co., Ltd.	La Have	New Germany	30	6	1,500	
Gaspereau River Light, Heat & Power Co.	Gaspereau	Whiterock	30	1	580	
St. Croix Paper Co.	St. Croix	Hartville	28	3	100	
Panuke Pulp & Paper Co.	St. Croix	Hartville	27	3	1,000	
		Total			17,999	
		Canada			476,503	

(a) Under construction.
(b) Portion of power is exported to U S
(e) All or portion of power converted to hydro-electric energy.
(p) Hydro-electric energy is also purchased from an outside source

Table No. 2

Pulp and Paper Mills in Canada Operating Entirely from Purchased Hydro-electric Power

ONTARIO

Company	Head Office	Location of Plant	Power Purchased From
Fort William Paper Co.	Fort William, Ont.	Fort William, Ont.	Kaministiquia Power Co.
Provincial Paper Mills	56 University Ave., Toronto, Ont.	Port Arthur	Hydro Electric Power Comm.
Nipigon Fibre & Paper Mills	Nipigon, Ont.	Nipigon	Hydro-Electric Power Comm.
Timiskaming Pulp & Paper Co.	Haileybury, Ont.	Haileybury	Northern Ontario Light & Power Co.
Fibre Board	Penetanguishene	Penetanguishene	Hydro-Electric Power Comm.
Interlake Tissue Mills	Merritton	Merritton	Hydro-Electric Power Comm.
Ontario Paper Co.	Thorold	Thorold	Toronto Power Company and Hydro-Electric Power Comm.
Hinde & Dauch Paper Co.	43 Hanna Ave., Toronto	Toronto	Hydro-Electric Power Comm.
Don Valley Paper Co.	714 Dominion Bank Bldg., Toronto	Don Valley, Tononto	Toronto Power Co.
Canadian Nashua Paper Co.	Peterborough, Ont.	Peterborough	Hydro-Electric Power Comm.
Canadian Paperboard Co.	2 Seigneur St., Montreal, P. Q.	Campbellford	Town of Campbellford
Hydro-Electric Power Com.	Toronto, Ont.	Campbellford	Hydro-Electric Power Comm.
Provincial Paper Mills	56 University Ave., Toronto, Ont.	Mille Roches	St. Lawrence Power Co.
Cornwall Pulp & Paper Co.	Cornwall, Ont.	Cornwall	Hydro-Electric Power Comm. & St. Lawrence Power Co., Ltd.
Riordon Company, Ltd.	355 Beaver Hall Sq., Montreal, P. Q.	Hawkesbury	Hawkesbury Electric Light & Power Company.

Table No. 2 (Continued)

QUEBEC

The Beaver Company	Buffalo, N. Y.	Aylmer Road	Hull Electric Co. Ltd.
Valleyfield Coated Paper Mills	Valleyfield	Valleyfield	Valleyfield Electric Co.
Bennett Limited	Chambly Canton	Chambly Canton	Montreal Light, Heat & Power Consolidated
International Paper Co.	30 Broad St., New York City	Three Rivers	Shawinigan Water & Power Co.
Wayagamack Pulp & Paper Co.	Three Rivers	Three Rivers	Shawinigan Water & Power Co.
St. Maurice Paper Co., Ltd.	Board of Trade Bldg., Montreal, P. Q.	Cap Magdelaine	Shawinigan Water & Power Co.
Laurentide Company, Ltd.	Grand'mere	Grand'mere	Laurentide Power Co. Ltd.
The Ha! Ha! Bay Sulphite Co.	Port Alfred	Port Alfred	La Soc.d'Eclairage et d'Energie Electrique du Saguenay

Table No. 3

Hydraulic Power in Pulp and Paper Mills—Characteristics of Various Groups

Groups	Number of Mills in Group	Horsepower				Avg. Daily Producing Capacity per Mill in Group Tons		
		Own Turbine Installation	Purchased Hydro Electric	Total for Group	Total per mill in Group	Pulp	Paper	
							News	Others
1	2	3	4	5	6	7	8	
British Columbia.	5	48,800		48,800	9,760	117	89	6
North & Western Ontario.	7	81 150	16,350	97,500	13,930	173	93	4
North Lake Huron.	3	48,810		48,810	16,270	268	223	
Niagara & Toronto District.	17	6,943	42,142	49,085	2,890	33	18	18
Eastern Ontario.	14	33,721	13,630	47,351	3,380	42	12	17
Montreal District & Western Quebec.	15	36,558	3 345	39,903	2,660	28	5	17
Eastern Townships.	6	30 152	8,500	38,652	6,440	90	18	24
St. Maurice Valley & Three Rivers District.	6	21,110	66,350	87,460	14,570	268	111	27
Quebec City District.	14	15,982	3 760	19,742	1,410	15	10	7
Lake St. John & Saguenay District.	7	87,900	6,500	94 400	13,490	176	44	5
Lower St. Lawrence & Gulf.	6	32,710		32,710	5.450	72		
New Brunswick.	3	14,668		14,668	4,890	93		
Nova Scotia.	10	17,999		17 999	1,800	23		

Note: The large capacity of mills predominating in certain districts is emphasized by the figures under Column 6, while the class of production characterising each group can be judged by the figures under Columns 7, 8 and 9

Table No. 4

Character of Hydraulic Motive Power in Pulp and Paper Mills in Each Province

Province	No. Mills	Installed and Purchased Power - H.P					
		Turbine Installation					
		Direct Drive	Hydro-Electric Drive	Total	Purchased Hydro Electric Power	Total Hydro Electric Cols. 4-6	Total From all Sources Cols. 5-6
1	2	3	4	5	6	7	8
British Columbia	5	27,975	20,825	48,800		20,825	48,800
Ontario	41	89 430	81,194	170,624	72 122	153,316	242,746
Quebec	54	159,900	64,512	224,412	88,455	152,967	312,867
New Brunswick	3	2,368	12,300	14,668		12,300	14,668
Nova Scotia	10	17,919	80	17.999		80	17,999
CANADA	113	297,592	178,911	476,503	160 577	339,488	637,080

Column 3 represents the installation which is used to drive the mill machinery, such as grinders, etc., directly from water power.

Column 4 represents the installation also operated by pulp and paper organizations but where the power is first converted into hydro-electric energy and electric drive is used to operate all or a portion of the mill.

Column 5 is made up by adding columns 3 and 4 and represents the total water-power installation operated by the pulp and paper organizations themselves.

Column 6 represents the amount of electric energy derived from water power and purchased from central electric stations for use in the pulp and paper industry.

Column 7 is made up by adding columns 4 and 6 and is an indication of the use of electrical energy derived from water power in the pulp and paper industry.

Column 8 gives the totals of columns 5 and 6 and indicates the total installation and purchased power for the industry derived directly or indirectly from water power.

New Executive of C. E. A. Already Actively at Work

The first meeting of the new Administrative Executive Committee of the Canadian Electrical Association (Incorporated) for the Association's year 1922-23 was held on June the 29th. in Montreal.

C. J. Johnston, comptroller of the Southern Canada Power Comp. was elected treasurer of the association, and Louis Kon, secretary-manager of the Electrical Co-operative Association, Province of Quebec, was appointed secretary.

The association feels that the work of the Commercial Section in the past was not developed to the extent of its possibilities and needs or as far as the opportunities warrant and conditions call for, therefore, it was decided to appoint a special general committee, under the guidance of the chairman of the Commercial Section, Mr. L. W. Pratt, of the Hamilton Cataract, Light and Traction Company, and consisting of the following members: W. O'Brien, Montreal Light Heat & Power Con.; Geo. B. Atchison, Southern Canada Power Comp.; J. H. O'Hara, Ottawa Electric Comp.; P. R. Labelle, Shawinigan Water & Power Comp.; Kenneth McIntyre, Can. Repr. Society for Elec. Dvlpt. and nominees of the Canadian General Electric, Northern Electric and Canadian Westinghouse Companies.

It is hoped that each member of the General Committee will take up some phase of the commercial activities of the electrical industry, giving particular study to his chosen subject and that it will result in bringing before the next year's convention a larger number of reports and more discussion of commercial problems than was the case heretofore. It is safe to state that with the general committee as formed and the sympathy of the president elect, Mr. P. T. Davies, towards a policy of constantly improving the technical section but to bring, at the same time, the commercial section on a par with the former, gratifying accomplishments for the general good of the electrical industry will result as the work progresses.

Standing Sections and Committees for the ensuing year were appointed as follows.

Commercial Section

Chairman,—L. W. Pratt, Hamilton Cataract Light & Traction Co., Hamilton, Ont.; Power Sales Bureau,—W. O'Brien, Montreal Light, Heat & Power Con. Montreal, Que.; Merchandise Sales Bureau,—Geo. L. Atchison, Southern Canada Power Co., Montreal, Que.; Light Sales Bureau,—J. H. O'Hara, Ottawa Electric Co., Ottawa, Ont.; Representative on Committee on Commercial Service Relations with Customers,—Chas. T. Barnes, Toronto and Niagara Power Co., Toronto, Ont.

Accounting Section

Chairman: Paxton Little, Canadian Niagara Power Co., Toronto; C. J. Johnston, Southern Canada Power Co., Montreal; H. R. Lyons, Montreal Light, Heat & Power Con. Montreal; J. J. O'Brien, Quebec Rly. L. H. & P. Co., Quebec City, P. Q.; F. A. Jansen, Ottawa Electric Co., Ottawa. Ont.; J. Bailey, Shawinigan Water & Power Co., Montreal, and a nominee of the Bell Telephone Co.

Technical Section

Chairman: R. J. Beaumont, Shawinigan Water and Power Co., Montreal.

Underground System Committee:—Chairman, L. A. Kenyon, Montreal L. H. & Pr. Con. Montreal; R. B. McDunnough, Publ. Serv. Corp. of Quebec, Quebec; Geo. Kirlin, Standard Underground Cable, Montreal; H. D. Johnston, Eug. Philips El. Wks., Montreal; W. S. Vipond, Northern Electric Co., Montreal.

Inductive Interference Committee:—Chairman, J. Mores, Shawinigan Water & Power Co., Montreal; Mr. Lawson, Can. Niagara Power Co., Toronto, Ont.; E. C. Read, Montreal L. H. & Pr. Con. Montreal; Nominees, Can. General Elec & Canadian Westinghouse.

Lamp Committee:— Chairman, W. Kintner, Canadian Westinghouse Co., Montreal; J. T. Scott, Canadian General Electric Co., Toronto; Appointee of Laco Lamp Company.

Overhead System Committee:— Chairman, A. A. Dion, Ottawa Electric Co., Ottawa; O. V. Anderson, Toronto, & Niagara Power Co., Toronto; G. M. Anderson, North Shore Power Co., Three Rivers, Que.; E. A. Stanger, Southern Canada Power Co., Montreal; A. B. Cooper, Ferranti Meter & Transformer Co., Toronto; R. J. Everest, Electric Service Corp., Shawinigan Falls, Que.; Representative of the Bell Telephone Co.

Hydraulic Committee:— Chairman, S. Svenningson, Shawinigan Water & Power Co., Montreal; J. S. H. Wurtele, Southern Canada Power Co., Montreal; R. M. Wilson, Montreal Light, Heat & Power Con. Montreal; Appointee Dominion Engineering Company, Montreal.

Meter Committee:— Chairman E. Holder, Shawinigan Water & Power Co., Montreal; Scott Lynn, Sangamo Electric Co., Toronto; E. G. Ratz, Can. Westinghouse Co., Hamilton; E. J. Turley, Montreal Light, Heat & Power Con. Montreal; E. R. Spende, Southern Canada Power Co., Montreal; S. L. B. Lines, Lincoln Meter Co., Toronto; Nominees of Nova Scotia Tram. & Power Co.; Canadian General Electric, Ferranti Meter and Transformer and Packard Electric Cos.

Rural Lines National Committee:— Chairman, R. J. Beaumont, Shawinigan Water & Power Co., Montreal; A. A. Dion, Ottawa Electric Co., Ottawa; P. T. Davies, Southern Canada Power Co., Montreal; G. M. Anderson, North Shore Power Co., Montreal; Nominee of the Bell Telephone Company.

Accident Prevention National Committee:— Chairman, Willis Maclachlan, Toronto, Ont.; A. P. Doddridge, Que. Rly, Lt. H. & Pr., Quebec, P.Q.; J. T. Lambert, Ottawa Electric Co., Ottawa; J. H. Martin, Bell Telephone Co., Toronto; E. Puxton, Canadian Westinghouse, Hamilton; J. W. Dunfield, Southern Canada Power, Sherbrooke, Que.; L. B. Temple, Montreal Light, Heat & Power Con. Montreal; J. C. Smart, Shawinigan Water & Power Co., Joliette.

Public Relations Section

Chairman: J. B. Woodyatt, Southern Canada Power Co., Montreal.

On behalf of the Public Relations Section, its chairman Mr. J. B. Woodyatt expressed his opinion that it is almost impossible and not desirable to centralize that committee's work, the reasons for it being the very great distance between the various points of organized activities in the electrical industry of the Dominion, the differences of political opinions in the various Provinces and greatly varying conditions in the various sections of the country.

Therefore it was decided to assist wherever practicable the formation of Co-operative Associations and Leagues which would be purely local in their scope of work, and to help in exchange of ideas and results of theoretical as well as practical work undertaken on the Co-operative basis by the various local electrical Associations, Leagues and Clubs.

On the whole the programme for the ensuing year shows a strong desire to enlarge the scope of the association's work towards practical results which would give better service to the public in every respect at the same time increasing financial returns to the electrical industry through better salesmanship and greater realization by consumers of the economic and social value of electrical energy and electrically driven labor saving devices.

Lamp Temperatures in Modern Lighting Practice

By J. T. SCOTT*

The question of operating temperatures of incandescent lamps has so often arisen that a short survey of the subject will perhaps settle some doubts and prove generally instructive.

The main facts presented here are based upon a series of experiments carried on over a period of years by C. L. Dows and W. C. Brown at the Nela Park Labatories of the General Electric Company.

Extensive research has been undertaken to determine the extent of the hazard resulting from the use of incandescent lamps in atmospheres such as are found in flour mills, grain elevators, etc., where there is liability of dust explosions.

Fires or explosions which may be caused by incandescent lamps in dust-laden atmospheres are of two kinds: (1) Fires resulting directly from ignition of dust accumulating on the lamp bulb: (2) Explosions resulting from the accidental breakage of lamps in a dusty atmosphere containing the proper proportions of air and dust to form an explosive mixture. Such an atmosphere is frequently found where such materials as starch, oatmeal, grain, flour or sugar are handled.

(1) Fires From Ignition of Collected Dust

There is a considerable margin between the smoking and ignition temperatures of the various dusts. There are numerous conditions which determine whether or not this margin is safe, such as the character and the ignition temperature of the lamp bulb on which the dust accumulates. The two tables following indicate that there is a safe margin between lamp operating temperatures and the ignition point of various dusts.

Table 1. Operating Temperatures of Tungsten Lamps

Size of Lamp	Temperature of bulb (maximum) Deg. F.	Temperature of bulb at junction of brass and glass Deg. F.
50 watt Vacuum	135	113
75 watt Gas-filled	240	181
100 watt Gas-filled	262	183
150 watt Gas-filled	338	150
200 watt Gas-filled	330	171

Table 2. Margin of Temperatures of Various Dusts

Name of Dust	Smoking Temperature Deg. F.	Ignition Temperature Deg. F.	Difference between Smoking & Ignition Temperature Deg. F.
Sample No. 1	288	511	223
Sample No. 2	298	536	238
Sample No. 3	295	532	237
Cocoa	313	558	245
Cornstarch	284	891	607
White Wheat Flour	315	919	604
Cornmeal	311	934	623

Sample No. 1—20% Oats Dust, 40% Winter Wheat, 10% Hard Winter Wheat, 30% Miscellaneous Dusts.

Sample No. 2—60% Oats, 35% Winter Wheat, 5% Rye.

Sample No. 3—40% Winter Wheat, 35% Barley, 25% Oats.

The smoking temperatures are about the same as the operating temperatures of the smaller, or lower wattage gas-filled lamps, but are 100 to 150 degrees higher than the bulb temperatures of vacuum lamps of corresponding wattages. From this it can be seen why dust smokes readily on gas-filled lamps and not on vacuum lamps.

It will be noted that the temperatures at which most dusts will ignite, are more than 300 Fahrenheit degrees above bulb temperatures of the 75 watt and 100 watt gas-filled lamps. Experiments conducted in a compartment where a permanent dust cloud was maintained, showed all attempts to start a fire with the 75 watt and 100 watt gas-filled lamps, or with vacuum lamps up to and including 100 watt sizes, as unsuccessful.

The temperatures at which some of the other dusts will ignite are more than 700 degrees F. above the bulb temperatures of vacuum lamps, and more than 600 degrees F. in the case of the 75 watt and 100 watt gas-filled lamps.

If any inflammable dust is permitted to collect thickly enough and remain long enough upon a bulb, a fire is almost sure to follow. For this reason it is difficult to set any definite workable limits between bulb temperature and ignition temperature, which may be considered safe in all cases. Vacuum lamps may generally be considered safe. The 75 watt gas-filled lamp would hardly be expected to cause a fire when suspended in a freely circulating atmosphere. With the larger wattages and drier dusts, the margin of safety might be so reduced that there would be a possibility of fire.

There is far less hazard in the general lighting system than in the practice of using lamps on drop cords. At times, lamps are allowed to become actually buried in bins of grain and the like, and the fire risk is of course greatly increased.

(2) Fires From Lamp Breakages

The possibility of fire from accidental breakage of lamps is of much greater importance than that resulting from the collection of dust on an incandescent lamp bulb.

It is only on rare occasions that lamps are broken otherwise than by accident or careless usage. The use of an unprotected lamp at the end of a portable cord in a dusty atmosphere is careless in the extreme.

Whenever there is the possibility of an explosive dust cloud being present, incandescent lamps should be provided with protection against breakage. Vapor-proof units give some degree of protection. A wire guard for the globe of the vapor-proof fixture will greatly increase its resistance to breakage. The essential point in this connection is that the filament of the lamp should be so protected that there is no possibility of its becoming exposed to the dust-laden atmosphere.

The incandescent lamp is by far the safest illuminant in existence for use in these locations, but its application has been given too little attention up to the present time. Properly installed and properly used, it will be found to fill all requirements.

This holds good also for the use of incandescent lamps in such places where pulverized coal, gasoline, oils etc., are handled and where explosive gases or vapors may be present in the air.

Soon after the gas-filled lamp was introduced in the early part of the year 1914, criticisms began to be heard because of the greater amount of local heat developed. The bulb which felt hot to the touch, the extreme brightness of the filament, and the larger power consumption combined to make the fire hazard appear greater than it really was.

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*Sunbeam Lamp Division, C.G.E. Co., Ltd.

In some districts, local inspectors formulated rulings which were so strict that installation of gas-filled lamps was greatly hindered.

Almost invariably, rules relating to the installation of gas-filled lamps contained a reference to ventilation, which was expected to lower the temperature of the unit.

There is no doubt that ventilation, however slight, usually cools the lamp bulb and some other parts of the unit to a certain extent, but this is ordinarily accompanied by a corresponding rise in the temperature of other parts. A considerable number of tests indicate that ordinary ventilation does not always cool the wire and socket parts, but actually raises their temperature in many instances.

There will be appreciated the big advantages of keeping a unit tight so as to reduce dirt accumulation, improve the light efficiency etc., and there are many well designed types of enclosing units with temperature actually less at the socket and wire entrance due to non-ventilation.

It should be recognized that radiation is just as effective in dissipating heat as ventilation—in fact, the 'chimney effect' of ventilation often increases the temperature of the very parts that it is desired to keep cool.

The growing tendency on the part of fixture manufacturers toward non-ventilation units is evidenced by the number of such units as have been placed on the market within the past year. By taking care of heating through radiation rather than ventilation, marked progress has been made, not only toward better control of temperatures, but in the direction of slower dirt accumulation, greater ease of cleaning better appearance, and greater accessibility in handling the unit.

The incandescent lamp is the most reliable of all modern illuminants, and it is hoped that the information given here will suffice to dispel any doubts that may be felt with regard to conditions of safety and the operating temperatures of such lamps.

"House to House Appliance" Selling

By O. R. HOGUE[*]
Commonwealth Edison Company

Door-to-door canvassing does not mean the front door; it means the back door, where we find the lady of the house who does her own work and who above all others appreciates labor-saving devices of all kinds.

We have found from experience that there is an enormous turnover in salesmen doing this class of work, and in order to maintain a force of one hundred men who can properly sell electric appliances, it is necessary to give them at least an initial knowledge of the appliances they are to sell, to instruct them in the policy of the central-station company and to get them started on salient selling talks. We have, connected with the Commonwealth Edison Company, the Central Station Institute, where they are taught the merits and value of the appliance, and how to give this information to the prospective customer. They also receive briefly the mechanical and electrical knowledge that is just as necessary a component in their general knowledge as how to convince the "prospect" that the appliance is something that will be of value to her in her every-day life. After this instruction the men are turned over to the campaign captains, with a concrete foundation on which to start.

Our policy is to sell from door to door. We use electric trucks capable of holding a fair quantity of appliances of various kinds, which is supervised by a captain who has under him a crew of from ten to fifteen or sixteen salesmen, never more than that number. These wagons are loaded at one of our warehouses each morning at about 8 o'clock, under the direct supervision of the wagon captain, as he is called, and goes immediately to a designated location where the crew has been instructed to meet the captain. The city is divided into districts, with definite boundary lines, beyond which any one wagon is not permitted to sell. The captain allots districts within this district to each man, and the work of the day is begun at 8:30 at the latest. Each member of the crew has a sample of the appliance, whatever it may be —an iron, a toaster, a lamp, etc.—and he proceeds to the district allotted to him. If he sells his goods, he leaves the article and returns to the wagon for another.

There are only certain lines of goods that can be sold satisfactorily in this way—the smaller articles, easily handled and which sell for sums within reach of the moderately situated citizen. We originally figured that this back-door campaigning was only a summer proposition, but for the past year we have maintained our campaign force during the entire year with exceedingly satisfactory results. We shift from irons to heaters, to portable lamps and to a combination iron and ironing board at a special price, of which we have recently sold about eight thousand. These, together with percolators and toasters, warming pads and many other similar articles, seem to be in demand.

The selling of portable lamps is an especially new idea with us and we expect to continue this line indefinitely. We are also developing a line of smaller articles such as fuse plugs and twin sockets which the men can carry in their pockets.

Compensation of Salesmen

Many schemes have been tried to compensate the salesmen on an equitable basis, such as a guaranteed sum per week and a salary and commission basis; but we have found from long experience that the only satisfactory way is the commission basis, and the commission must be large enough to attract a good salesman. A dollar per iron we feel should be the minimum, and $1.50 for a portable lamp selling at various prices up to $15.00. The captain of the crew is paid a straight salary. If to this salary a bonus on sales made by his crew is added, he will work that much harder to increase his wagon's sales, not only increasing his own earning capacity, but incidentally the earning capacity of the men in his crew. A prize system for the wagons with the largest sales over and above a stipulated sum works wonders. An extra bonus for the men selling over a certain number on some particular article during any given week also adds zest to the selling.

In conclusion, I wish to emphasize that this class of merchandising can only be sold in large quantities by this door-to-door canvass, and it is a profitable business from the standpoint of merchandising. Moreover, it is a very essential line of business for the central station, as it is the very best means of increasing the customers' use of central-station service. The customer first becomes interested, perhaps, in the electric iron; then a percolator or a toaster is added to the list, and finally the greater labor-saving devices, such as the washing machine, mangle and vacum cleaners, are installed in the home. Each appliance adds something to the customer's bill for energy for the month; multiply this by the vast number of customers using these appliances, and the income to the central station for additional energy is quite considerable.

W. F. Frizzell, for 20 years superintendent of the Glace Bay Power Plant, Glace Bay, N. S., died on June 29, following a stroke of paralysis. He had been unwell for some months. He was a native of Hills County, N. S., and 65 years of age.

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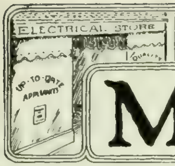
[*] Before Illinois Utility Association



BETTER MERCHANDISING

"We Must All Face the Situation Squarely"

Victoria, B.C.

Editor Electrical News:—

Taking into consideration the general financial conditions prevailing I believe that serious thought should be given by all firms selling electrical appliances to the adoption of a more generous policy in respect to the time payment sales plan, in order to stimulate business and to enable people of limited incomes to gradually acquire a complete outfit of the more useful and necessary electrical conveniences for the home.

Locally we have gone extensively into the time payment method of making sales and the results have been very gratifying, a particularly important item being, that by careful supervision by our credit department, bad debts covering this class of business during the past year have been practically nil.

There are hundreds of consumers in all cities who, owing to their small means, are unable to pay all cash when making purchases; it is to such as these that the easy payment scheme if properly presented, would appeal. Some dealers are adverse to the idea; however, the situation is that conditions are not what they were some years ago and sales policies must be altered to meet the new conditions; if approached from the right angle there is a splendid opportunity to create profitable additional business by making it easy for people to buy. With the exception of a few articles such as electric irons, the majority of the other appliances are only to be found in, on an average, from 5% to 20% of the homes in the United States and Canada. It is evident therefore, that there is plenty of scope for us all to do some real big business which will benefit not only the jobber, dealer and central station, but assist in keeping our factories going.

The writer was recently in California and noted the aggressive measures being taken by the large departmental stores in featuring electrical appliances; splendid large window displays were in evidence and easy time payments arranged for. The thought **was left with me that if we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales** and this, I feel sure, includes making it easier for the average family to purchase electrical goods.

S. J. Halls,
Manager Light & Power Department,
B.C. Electric Rly. Co., Ltd.

Vacuum Tube Renders Possible High Development of Wireless

Success Lies in Amplification of Electrial Impulses

Previous articles of this series have dealt with the construction of radio sets without the use of amplification. The sets discussed have been of an elementary type and though generally such arrangements are known to work well, range and clearness as obtained with them do not compare with the results achieved using vacuum tube arrangements.

The Edison Effect

Edison, Fleming and DeForest, among others, have done pioneer work resulting in the present apparatus. The first named discovered that if a cold plate is placed inside an electric light bulb, and if the plate is connected to a battery in such a way that it is slightly positive, an electric current will flow from the heated filament to the cold plate. Fleming constructed a similar piece of apparatus known as the Fleming oscillation valve. The introduction of a third member into the vacuum was first done by DeForest: this third member is called the grid and is a zigzag wire placed between the filament and the plate. (See Figure.)

Working of the Vacuum Tube

The theory of the manner in which this arrangement works is somewhat complicated and it is proposed to explain it in as simple a manner as possible.

When the filament is heated electrons are drawn over to the plate, which is positive. Within limits, the more positive the plate is made, and the higher the filament temperature, the more electrons flow from the filament to the plate.

The action of the grid may be understood by considering the space in the tube as a resistance to the flow of the electrons. The grid may be considered as varying this flow. If it is charged positively it decreases the resistance and more current flows, and vice versa.

Positive Oscillations Produce only Slight Changes

The diagram which is reproduced here shows a simple connection. It has been explained previously that an oscillating current is induced in the antenna which flows up and down through the primary inductance. This results in a similar oscillating current being set up in the secondary coil; obviously it varies from negative values to positive values. Now we know that a negative charge on the grid results in a drop in the plate current. This causes a drop in the current flowing through the telephone receivers. The positive oscillation does not produce as large a change in the plate current. The situation then is, that the negative halves of the current oscillations produce drops in the plate current while the positive oscillations produce very slight changes.

The incoming radio signal consists of a series of oscillations, called a "wave train," and the action of the apparatus is such as to smooth out the series of oscillations to a single drop in the telephone circuit. The grid is affected by a series of oscillations but the capacity of the receiver and the impedance of the receivers converts them to a single drop.

Hard and Soft Tubes

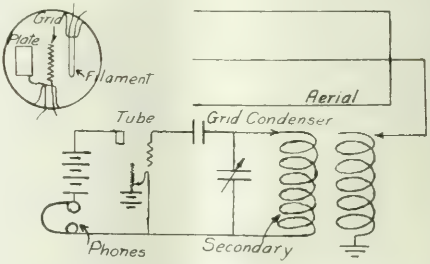
The vacuum tubes are made in two broad types, one called "soft" which has a low vacuum and consequently some gas in the tube, and the other "hard", having a nearly perfect vacuum. In general the gas-filled or soft tubes are more sensitive detectors but the hard tube is more easily adjusted, as it takes a definite plate voltage and a fixed value of filament current. When these values are reached the "hard" tube is ready for operating.

Vacuum Tubes also Amplifiers

The vacuum tube may also be used as an amplifier Small changes in the grid can be made to produce large changes in the plate current. One method is known as the impedance method. In this method an impedance is inserted in the circuit in place of the telephone receivers, being connected to the detector in their place. The incoming signals are detected by the first vacuum tube, where their first amplification is received. They are again amplified by being put in to the impedance. Although two or three steps may be obtained by this method, i.e. by using another amplifier, it is not considered practicable to obtain more.

There are several different methods of hooking up such a circuit. A straight ohmic resistance varying from ½ to 3 megohms, may be used in the circuit in place of the impedance. For the best results this resistance should equal the resistance which exists from the filament to the plate of the tube used.

Another method is that of using a small transformer in place of the resistance of impedances. This method is advantageous, in that the transformer can be used to step up the voltage causing greater amplification. Maximum amplification from a given tube without distortion is obtained when the input side equals the impedance of the filament to the plate path of the first tube, while the secondary has an impedance which is equal to the impedance from the filament to the grid of the amplifying tube; the transformer method permits of this.



The Armstrong Method

There have been other developments resulting in changes in various parts of the apparatus. Major Armstrong developed a circuit which required a single tube not only to detect, but also to amplify. His method was to take the amplified signals, which would ordinarily go to the telephone receivers and to feed these signals back to the input of the vacuum. They will then be amplified and reappear at the outlet. It is possible to return them to the input again and they will again reappear at the outlet considerably amplified.

In this method, instead of the telephone circuit running directly back to the input circuit, it runs through an extra coil, which is placed near the secondary inductance. The position of this coil is such that variations of current in it cause variations of current to be induced in the secondary. This results in these variations appearing in the telephone receivers, with a great degree of amplification.

When it is found that loud speakers are used and the signals are heard all over a room, it is generally in connection with the Armstrong method. Audio frequency amplifiers are used after amplification has been obtained by this method, resulting in greatly increased intensity.

The Uses of Radio in Business

The present popular demand for radio instruments is the result of the first general radio broadcasting which was carried out. It may be said to be due to the far-sightedness of one of the largest equipment manufacturers, who instituted the practice. Latterly, however, there has been a development in another direction, in the demand for instruments for practical business purposes; as the real future of the radio business depends upon this demand it is of interest to note what practical business uses have been found for this method of communication.

Radio Fosters Goodwill

The idea of fostering goodwill among patrons by sending them musical and other entertainment programs is the first use to which commercial broadcasting has been put. In September, 1921, the world's baseball series was sent out, play by play, from a department store. The returns were received in the store by telegraph, and farmers and others, in a wide radius outside, heard the news almost as quickly as the city fans. The wide publicity obtained and the popularity of this stunt induced the store manager to send out daily concerts.

Banks and other concerns which need the goodwill of the farmers have made a specialty of broadcasting crop reports, and financial information of a type likely to interest their clientele. Weather predictions and such like information is of vital importance to the farmer and it may be supposed that he feels rather kindly towards the concern that benefits him in this way.

Expense a Deterrent

There are several reasons, however, which prevent the universal use of broadcasting apparatus. One of the most potent is the high cost of such apparatus. Running expenses and the salary of an operator, make the costs high and many concerns are unwilling to bear the expense, particularly as it is difficult to estimate exactly the value of the publicity gained. At the same time, only a few stations in each district can be accommodated, working simultaneously. The operation of many stations in the same district results in nothing but confusion. In this regard it wuld appear to be first come, first served, however, it has been found by experiment, that the public will listen in up to midnight and there would seem to be still plenty of room in Canada.

Concerns who do not care to undergo the expense of a transmitting outfit have nevertheless found means to use the receiving apparatus in their business. One such firm has started a class to teach boys radio and is co-operating with high school science classes. Another store has found that the installation of receiving apparatus in departments where sales are being held gives much added publicity and brings good results. There may be some doubt as to the exact value of the publicity gained, but it is certain that an arrangement in which the horn of the apparatus projects through a window over the street draws the crowd, as has been found by a concern that tried such an arrangement. Some progressive restaurants have provided headpieces for each table. This is somewhat of a change from the usual loud speaker but it has been more satisfactory.

Direct Advertising Not Feasible

Experience so far seems to prove that the radio telephone cannot be used as a direct advertising medium. It would seem admirably adapted for such use, but people do not want to listen to spoken ads.; for another thing, picture what a mix-up there would be if every large concern tried to broadcast its advertising! No doubt the problem may be solved by future developments in the science, but for the present the recommendations that have been made to the effect that direct advertising by radio should be limited to a statement of the call letters of the station and of the name of the concern, would seem to be reasonable.

The setting of a precedent which will be difficult to live up to is always a rather risky business and those concerns who have been receiving broadcasting concerts for the benefit of their customers are finding it so. People get accustomed to good concerts and when there are none available, or when static interferes, the irritation of the expectant audience almost cancels the goodwill previously obtained.

Some people do not appreciate the loud-speaking apparatus in restaurants and tea-rooms. The manager of a place where such an outfit had been installed said that at first his customers were pleased with the innovation but later appeared disinclined to hear it every day.

These small difficulties are, however, but incidental. Radio has a place and has fitted marvellously into business where it was never before dreamt of. Power companies, steamship lines, forest rangers, timber operators and railway companies are now easily carrying on communication in cases where previously they would have been much handicapped. Those who are at all acquainted with the subject say that the day of radio is just beginning and that though it is early to prophesy, there can be no doubt but that its use will materially effect our present business methods.

Keeping Trains in Touch With Headquarters by Wireless

The Canadian National Telegraph System is carrying on some very interesting experiments on the utilization of radio, not only for the convenience of passengers on the Canadian National Railway System, but also with a view to expediting, and reducing the cost of operation. Experimental cars have been fitted out with receiving sets and results have been so satisfactory that it is planned in the near future to equip all the transcontinental trains with receiving equipment.

Railway companies, generally speaking, have an advantage in the fact that their lines are generally paralleled closely by telegraph lines, which have the effect of guiding the waves and increasing the range over which messages may be received. It is also the intention of the company to establish transmitting sets with a range of 75 to 100 miles, so that trains in transit may be constantly in touch with stations.

Though the whole matter is necessarily in the experimental stage, the results have been so satisfactory to date that the officials of the Canadian National Telegraph System are very optimistic regarding the advantages to be gained by the use of radio and are carrying forward their experiments as expeditiously as possible, with a view to establishing what will probably be the first transcontinental radio service in North America.

Mr. Alfred Potvin, foreman of the Public Service Commission, of Quebec City, died June 28. He collapsed suddenly and succumbed before medical assistance could be rendered. Deceased was known as an excellent electrician.

Manitoba Telephone System Considering Three Wireless Stations in the Far North

Investigations are being carried on at the present time for the purpose of erecting three wireless telephone stations in the northern parts of Manitoba, which would eventually link up with the wire system. One of these stations would be erected at The Pas, another probably at Norway House, and the third at Churchill, or another point to be decided on

The apparatus would be designed to deliver 500 watts of radio frequency power to the antenna system, under proper transmitting conditions these sets would have a range of several hundred miles. It is difficult to state definitely just when any of these stations will be in operation, but it is hoped to have The Pas station, at least, in operation this year.

Under present conditions communications north of the 53rd parallel are limited by the speed at which men or dogs can travel, in summer by canoe, in winter by sled. Always during spring and fall there is a season of six weeks during which the formation or breaking up, as the case may be, of the ice, renders any kind of travel impossible; thus under present conditions during nine months of the year, communication between civilization and the northern outposts is necessarily slow and arduous; during the remaining three months all communication is at a standstill. The installation of wireless outfit does away at one stroke with all the difficulties hitherto experienced in getting news to and from these districts.

New Broadcasting Station at Bridgeport, Pa.

The Diamond State Fibre Co., of Toronto, has informed the Electrical News that at the parent plant of the company, at Bridgeport, Pa., they are now operating two 250-watt radio trons, power tubes operated by a high voltage, 1,500 watt direct current generator, equipped with fan type antenna, 110 feet high, consisting of 5 wires with 80 feet spread at top.

Market reports are sent out daily from 11.45 to 12, daylight saving time, on wave length 485 metres. Concerts are sent out Thursday evenings, 7.30 to 8.30, on wave length, 360 miles. Call station is WBAG.

The Diamond State Fibre Co. would appreciate hearing from any amateur picking up this station. Address 235 Carlaw Ave., Toronto, Ont.

Will Get Market Reports

A new scheme for "wired wireless" is in contemplation by certain radio experts, by means of which millions of farmers now out of the regular broadcasting range will be enabled to "listen in" to market and agricultural reports with small crystal sets, which have a receiving range of 15 to 25 miles. This scheme takes into consideration the broadcasting of speech by means of the electrical power lines which cover the country with a network of wires. A sending station may be at one end of a wire which penetrates many miles into the "backwoods," and any farmer who is located within about thirty miles from this wire, anywhere along the route, can "listen in" with ease, on a low-priced crystal outfit.

The National Boiler & General Insurance Company, of Manchester, England, have issued an interesting little book entitled "Working of Dynamos & Motors," which is a series of notes on the care, working and maintenance of dynamos and electric motors. The booklet is well illustrated and contains a number of interesting ideas for the operating man.

Radio Notes

Some radio enthusiasts have had results by connecting to a metal bedspring, to electric doorbell wires, to wires run around the moulding near the ceiling of a room. In fact, almost anything may be used for an antenna, if the set is sufficiently sensitive and near enough to a powerful broadcasting station.

In order to keep a crystal detector in perfect adjustment first find the most sensitive spot by a buzzer test. When the point of the "cat's whisker" is well placed, drop some hot beeswax of paraffin around it. In practice, this has kept the whisker in the right place for months, and eliminates the necessity of seeking the elusive sensitive spot every time the set is to be used.

To China goes the honor of installing the longest commercial radio telephone circuit in the world. Radio telephone sets have been installed at Pekin and Tientsin, covering a gap of ninety miles. These have been connected with the regular telephone lines of the Chinese Government.

High Tension D.C. is Best

In discussion of the provision of power for wireless purposes, a prominent English engineer considers that high-tension direct current still holds the field, and that for large-power sets it should be possible to construct thoroughly sound direct-current generators to give 10,000 volts and, say, 20 to 30 amperes from one commutator. Such machines would be of the nature of special engine-driven generators or motor-generators, which arrangement would be satisfactory, as by variation of field strength the transmitters could be more readily and safely tuned up to full power. He further states, that six-phase or twelve-phase transmission could be successfully arranged, using three-phase 50-period current from public supply mains as prime mover. Twelve-phase or, rather, 12-half-wave continuous waves could be practically as pure as direct-current-generated continuous waves, but for equal harmonics it is thought that they cannot be so efficient.

Ottawa District of O. A. C. D. Formed

The contractor-dealers in the Ottawa district met on the evening of July 4, at dinner, in the Russell Hotel, and formed the Ottawa District of the Ontario Association of Electrical Contractors and Dealers with the following officers:

W. L. Donnelly, chairman; A. C. McDonald, secretary-treasurer; H. L. Allen, P. E. Marchand, P. M. Grimes, C. A. Moodie, executive committee. Mr. H. L. Allen was elected district representative to the provincial executive.

The meeting was addressed by V. K. Stalford, of Hamilton, who spoke on the form of organization adopted by the Ontario Association, the value of such organization and, incidentally, described the most interesting features in connection with the "Electric Home" recently put on by the Hamilton contractor-dealers.

Little by little the Ontario Association is building up on a solid foundation. Several districts have already been formed, with one representative from each comprising the executive of the provincial association. The Ottawa district comprises not only the city of Ottawa, but includes also the surrounding territory.

In regard to the rumors that are flying around as to the profits made in the manufacture of radio apparatus, the experience of one manufacturer may be enlightening. He found that of every hundred pounds of galena he tested for his sets, 93-1/2 pounds had to be rejected as useless.

Two Prices for the Same Article

By REY E. CHATFIELD*

Recently the Board of Directors of an Association of representative business men of one of the largest cities on the continent passed the following resolution,—

"RESOLVED that the practice of giving preferential prices by dealers to individuals either individually or in groups, is deprecated, as **the practice of selling the same article to one buyer more cheaply than to another is wrong,** both economically and ethically, and is likely to lead to a condition of merchandising that is unsound and dangerous to the community."

The association consisted of representatives of every branch of business in the city and was aimed to correct a growing practice of giving one price to one man, another to another and so on.

In Vancouver we are suffering from the same disease, particularly in the electrical industry. The wholesaler, contractor-dealer and contractor who makes a price on an article or a job and then "cuts" or "loads" that price for the benefit, or to the deteriment of the individual, as the case may be, is following a very dangerous practice, which in time would lead the industry back to the era of bartering, goods for goods, where the best trader always won in the contest of wits.

Time is lost and money wasted when the purchaser must shop around, haggle and beat down the price.

Suppose for example, that there was no price made on a roll of films for your kodak and you visited another city or another section of your own city. Assume you have been accustomed to paying 35 cents a roll for your films in your own section of the city and you find on enquiry that the dealer you first approach asks 60 cents for the same films. Naturally you shop around and find another dealer who will sell you films for 50 cents and eventually you find a man whose price closely approaches the price you are accustomed to pay. This condition is true in the electrical industry. Contractors who are figuring on a bid often waste half a day getting quotations for material worth probably $200. These quotations must be tabulated and compared. Much time is lost.

How much better it would be if there were more stability in the trade and every contractor could feel that the price from his dealer is as good as he could receive from any one else.

On the other hand the public is learning that by shopping around they are able to gain tenders for wiring jobs at widely varying figures. A prospective home builder calls for tenders on his electrical wiring and gets a variety of bids, and nine cases out of ten he takes the lowest bid, and in just as many cases this low bid is not a fair price, either to the dealer, to the consumer or indirectly to the wholesaler.

There is only one solution to this condition—**Know your costs**—mark up a job or an article of merchandise properly to cover the overhead plus a legitimate profit and then **stick to your price.**

The practice of changing prices to meet alleged competition has been followed until to day the consumer in nine cases out of ten is getting something for nothing and **he does not know it.**

Have faith in the fairness of your price and stick to it and you will find that your competitor is doing the same thing.

Data has been gathered on the use of electrical appliances among various members in the industry in Vancouver, with very interesting results.

175 queries were sent out and we received replies covering 105 persons in the industry with the results tabulated below.

Appliances	No. Used.	Appliances	No. Used.
Chafing Dishes	2	Water Heaters	4
Electric Fans	6	Ranges	8
Electric Irons	79	Suction Cleaners	19
Grills	20	Toasters	50
Hedlote Heaters	13	Warming Pads	11
Immersion Heaters	5	Washing Machines	9
Percolators	15		

Not a bad showing but the people in the trade seem to favor the table appliances. Have faith in your own merchandise. **Use the appliance you sell.**

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*Secretary Manager Electric Service League of British Columbia.

How Do You Figure Contract Work?

By C. D. HENDERSON*

There is a growing tendency among electrical contractors to figure jobs on a retail price basis rather than by the old method of cost plus.

Many years of experience has proven that the latter method has many faults. First, most electric items are sold from a list, less discount, which means that one must go to considerable work arriving at the net laid down cost. Second, these figures are always of a confidential nature which you can not very well show your prospective customer and should you be fortunate enough to get the job, it is not always well for your wiring-man to know your exact cost.

If it should happen that you have enough confidence in your prospective customer to show him your cost sheet, the one item that stands out head and shoulders above everything else, in his eyes, is the percentage which you have added; and even tho' it might be as low as 25% (we hope not) it looks to him like a 25% net profit and you immediately leave yourself open for an argument with the result that he either beats you down in your price or you lose the job.

On the other hand, the new idea of figuring all work from a retail price list has numerous things in its favor. For instance—it is quicker and the danger of exposing confidential information is eliminated.

Let us take for a concrete example, a sample contract job. We will assume that you are asked to put in a price on rewiring a building. You first take off your list of materials; estimate the amount of labor required and then turn to your price list. Carry out the selling prices of the items and then if the job comes to a total of say—$570.20, you may if you think advisable, make a special discount of 10% by reason of the size of the job.

Now go to your prospect and show him all the different items required and the price of each, call his attention to the regular price of $570.20 and then show him that you are allowing him a special discount of 10% over and above what you would charge if the job were to cost $30.00 or $40.00

This is not simply a theoretical scheme which looks nice on paper. Some of the most successful firms have used it for the past three or four years and instead of losing business, it actually helps them procure work against the lower tenders offered by their competitors. Don't over-look the human element. Remember that most of us like to see items and furthermore where is the individual that is not pleased with a special discount.

Below is a list of a number of items picked at random, simply to illustrate the plan. Why not try it out? You will get just as much work if not more and will make a profit on every job.

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*President Henderson's Business Service and Canadian Manager Altorfer Bros., Co.

5,000	Ft. 14 Db. wire	.1½	$75.00
400	Ft. No. 8 Db. cable	.4¼	17.00
200	Ft. No. 4 Db. cable	.8¼	16.50
200	Ft. 1 conduit	.21	42.00
3	1" X condulets	.55	1.65
3	1" F condulets	1.40	4.20
5	1" LLB condulets	1.30	6.50
10	1" Porc. covers	.33	3.30
20	1" Blank covers	.30	6.00
3	FSS ½ condulets	1.50	4.50
5	1" J R G 2 conduletto fittings	.80	4.00
6	1" condulet elbows	.60	3.60
50	Outlet boxes	.25	12.50
50	Outlet box covers	.15	7.50
1	3x10x16 box		2.10
1	4x18x24 box		5.70
6	D. P. 100 Amp. cutouts	7.35	44.10
6	100 Amp. fuses	1.35	8.10
500	Knobs and screws	.4	20.00
2,000	Ft. loom	.3½	70.00
50	1" conduit locknuts	.7	3.50
60	1" conduit bushings	.16	9.60
20	No. 316 flush receptable, complete	1.25	25.00
1	100 amp. D. P. 250 volts switch box		18.20
2	lbs. solder	.50	1.00
3	lbs. friction tape	.75	2.25
2	lbs. rubber tape	.75	1.50
1,000	3x5/16 tubes	.1½	15.00
90	hours time 1st grade electrician	1.00	90.00
20	hours time 3rd year electrician	.75	15.00
50	hours time apprentice	.50	25.00
Inspection			9.50
			$570.20
	Less special 10% discount		57.02
			$513.18

Manitoba Electrical Association Planning for Coming Year

A meeting of the Executive of the Manitoba Electrical Association was held in the office of the representative, Mr. J. E. Lowry on Monday, July 3rd. Those present were—J. E. Lowry, F. H. Martin, G. R. Wright, John Whitsell, E. H. Smith, J. Rochetti, M. E. Deering, L. B. Dickson.

Plans for association activities for the coming year were the chief item of business and from the discussion that ensued it is quite apparent that a programme will be inaugurated that will carry a special appeal for every branch of the industry. Every member of the executive showed a keen desire to get busy and definite well thought-out opinions expressed show that these men are out to make the electrical industry wide and favorably known. The following committees were struck:—

Membership—G. R. Wright, Chairman; L. B. Dickson; M. E. Deering. The question of dues and field to be covered by membership campaign shall be the first duty of this committee.

Publicity—John Whitsell, chairman; H. C. Howard. Chairman has power to add to personnel. A committee to obtain material for electrical page shall be promptly arranged and this committee shall actively solict the support of all members in obtaining this material for Mr. Howard's use.

Public Relations—K. N. Forbes, chairman; John Whitsell; L. D. Dickson. This committee is to recommend those bodies with which we should seek affiliation and also report suggested activities with such as retail merchants, architects, builders exchange, etc.

Legislation—Prof. E. P. Featherstonhaugh, chairman; with power to add. Mr. Lowery will consult with Prof. Featherstonhaugh regarding work of committee in connection with existing license laws and apparent lack of administration of same.

Meeting & Programme—E. H. Smith, chairman; E. V. Caton; F. H. Martin. This committee is to arrange at once for picnic and also to make a special study of the question of an Electrical Club bringing in at some future time their findings and recommendations.

The atmosphere that prevailed throughout the meeting is best illustrated by citing the fact that Mr. Martin on behalf of The Manitoba Power Company extended an invitation to the members at large to visit as guests of The Manitoba Power Company, the new power development now in course of construction at Great Falls.

Morris E. Deering, late president of the Manitoba Electrical Association has accepted the onerous office of secretary for the coming year. Mr. Deering is Manager of the Northern Electric Company for the Winnipeg District.

Publicity Makes the Wheels Go Round

Publicity—that's another word for advertising. There are many ways to get it. You are putting out publicity when you advertise in your local papers, when you arrange window displays, when you distribute literature, when you demonstrate appliances. And they all pay because they all help create an impression and keep the fact that you are an up-to-date dealer, before the public.

Publicity is something that must be broadcasted continuously, for it is a well-known fact that, in order to obtain lasting and evenly-distributed results, an idea must be kept before the public constantly—or at least with some degree of frequency.

The history of business is full of instances where decline of prestige, dwindling of profits and even complete commercial failure have followed a curtailment of publicity. You can not, therefore, make any mistake if you take advantage of every opportunity to keep your store and the product you sell before the public mind.

There are many special ways of advertising that are good. Here are two or three that are being used with success. Perhaps they may give you an idea worth while.

One man has small tags which he attaches to all electrical fixtures which he sells in his store. One side gives data needed by the man who installs the fixtures and the other calls attention to the fact that the store handles all sorts of appliances. Another dealer has a contract with the telephone company which calls for an advertising tag to be attached to every telephone directory distributed in the surrounding territory.

Another good advertising stunt that has been used with gratifying results makes use of empty cartons. They are sealed up, given a coat of varnish to protect them from the weather and then, after a round hole is cut in the bottom they are ready to hang over fence posts out along country roads.

Dealers who have used this method of advertising say it pays.

The Municipal Transportation Commission, which is to study and report upon the advisability of the citizens taking over and operating the London Street Railway, has been announced by Mayor J. C. Wilson, of London, as follows: Sir Adam Beck, Philip Pocock, Ald. Gordon Drake and Ald. J. H. Childs.

Are You Getting Prospects This Way?

An enterprising firm of electrical dealers found out some very interesting things and collected a whole portfolio full of valuable information recently when they took advantage of the opportunity offered and arranged an exhibit at a fair held in their vicinity.

They also found out that, while there are a great many vacuum cleaners in use in their territory, there are probably as many more homes already wired for electricity but which have no electric cleaners.

Besides that, they learned the names and addresses of some 500 housewives who are interested in electrical appliances and who are, therefore, first-class prospects to follow up with sales effort.

They did all this, as indicated at the beginning of this story, as a result of taking advantage of the opportunity afforded by an annual fair, which is always an important event, and which, like all exhibits of a similar nature in hundreds of communities every year, attracts thousands of people.

As a specific means of getting names and addresses of prospects and information as to what appliances they owned, the firm announced that a vacuum cleaner would be given away on the last night of the show.

In order to obtain a chance on the cleaner, a prospect was required to fill out a card—giving her name, address and whether she owned an electric cleaner—and deposit it in a box provided for the purpose at the company's booth.

The thirteenth card drawn out of the box on the last night of the show won the cleaner.

While there were fully 60,000 people in attendance at the show during the week there were by no means that many chances given out on the cleaner. In fact, the dealer limited the number of cards to be distributed each evening, thereby adding incentive to obtain them—especially among women who were not owners of electric cleaners and who were, therefore, the very best of prospects.

Representatives of the dealer, in charge of the booth, lost no opportunities to demonstrate appliances to interested prospects and were kept continually on the jump. In addition, literature was distributed in large quantities.

While it would be beyond reason to expect that every woman who filled out a card, saw a demonstration or received a piece of literature would buy, it is a fact, nevertheless, that a surprisingly large number of sales that have been made since, are directly traceable to the efforts that were put forth at the fair.

The summer season is the open one for exhibitions of all kinds and it is the wide awake dealer who capitalizes the opportunity that they afford.

Company-Dealer Teamwork Can Put Over a Sales Campaign

The excellent results which can be obtained when dealer and manufacturer co-operate was strikingly shown in a recent campaign.

Though the population of the city in which the campaign was staged exceeds 100,000, there are only about 5,000 electrically lighted homes. With this market to draw from, and with four salesmen, in a period of two weeks, sales of Hoover vacuum cleaners were made by one dealer to the extent of over $5,000. Just how this result was secured is of interest to other dealers who are interested in increasing their sales.

The keynote of the campaign was its thoroughness. It was recognized at the start that half-way measures would result either in failure or half-success, neither of which would be profitable. The manager started to work on the campaign with the idea that it would be done right or not done at all.

Four salesmen were provided with cars; the announcing advertisment occupied sixty inches in three papers and subsequent advertisements were thirty inches and appeared daily.

In the dealer's store a fine floor display was given over almost entirely to the display of the appliance which was being featured and a large window was attractively decorated. All windows facing on two streets carried posters, while over the cashier's office on the interior a big flashing sign was installed bearing advertising for the special appliance and the words "Buy your Cleaner today."

The manufacturer of the appliance on which the campaign was centred also had two special representatives present throughout the campaign.

At the end of the first week the supply was exhausted and another order was placed by wire. Such a campaign is possible in many other towns but in every case the success achieved is largely a question of the effort put forth. Cooperation with the manufacturer and a determination to put the campaign over in a thorough fashion is the secret of success.

Boost Your Sales by Selling Something More

Here are a few ideas that will help the electrical dealer boost his sales total:

1. When you sell an appliance is your chance to explain about fuses. The customer may blame you when the lamps go dark if there are no fuses handy. Sell her an assortment.
2. The call for a motor for power purposes generally does not specify anything about switches; your chance to demonstrate and sell an enclosed safety switch.
3. Every woman wants a washing machine, but not so many of them know about the electric ironer; when you sell a washing machine do not lose the chance of demonstrating an ironer.
4. Toaster and hot plate go together; not toaster or hot plate, say toaster **and** hot plate.
5. Don't lose track of the possibilities in the way of additional sales of two-way plugs, feed through switches, etc. Every appliance sale gives an opportunity for this.
6. A customer who is sold on the comfort of one convenience is in good shape to be impressed with the merits of another—the electric washing machine and sew-motor logically follow the vacuum cleaner.

Daily Deliveries Tell the Story

An enclosed delivery truck having its sides covered with a well painted advertisement which harmonizes in color with his store front, has proved a good investment for one enterprising electrical dealer.

The background of the truck body is of delft blue, while the wheels are white with blue stripes—altogether a very striking car and one that attracts attention wherever it goes. The car is used to make daily deliveries, service calls and various other trips—through the business section and all over the residential part of the city as well.

As an advertising and utility proposition combined, the car is certainly effective. The tie-up between the store and the car is complete, due to the duplication of coloring on store front and car body, and the result is that there is an automatic association of ideas which works for the profit of the dealer who conceived the plan.

Lavender-Spence Co.

It is announced that the business that has been carried on by the Lavender-Spence Electric Co., of London, Ont., has been reorganized and that Mr. Spence's interests have been taken over by Mr. Jamer Elder. The business will in future be known as the Lavender-Electric Co. This business was first organized in 1920 by Mr. Lavender to supply electrical appliances and fixtures, wholesale and retail, and to undertake general contracting. Owing to increasing business, more capital was taken in and the sales end has been developed under the direct management of Mr. Elder who had been connected with some of the largest companies in Canada and the United States. The construction end of the firm is in charge of Mr. Lavender who was formerly with the Hydro-electric Power Commission and with the Northern Electric Co. This concern ranks well among the electrical firms in London, and signs indicate continued growth.

Descriptive Folder of New Hoover Cleaner

For the assistance of its dealer organization, The Hoover Suction Sweeper Company of North Canton, Ohio, has added to its literature a six-page folder descriptive of the company's latest product, Model 961, a new heavy-duty sweeper designed for use in clubs, hotels, offices and larger homes. This folder is smartly finished in three colors, with sand color and blue predominating, and contains a complete description of the merits of the new model. It is of a convenient size to be mailed as an enclosure with either a letter or a statement.

Emerson Contracts Awarded

Mr. George L. Guy, Consulting Electrical Engineer, Winnipeg, advises that the council of the Town of Emerson has approved the awarding of the contract for the labor of installing the distribution system of the town to Mr. B. Manger, Vingolf Apartments, Winnipeg; service transformers to the Packard Electric Company; intergrating watthour meters to the Canadian Westinghouse Company; copper wire, the Eugene F. Phillips Electrical Works and the Northern Electric Company; Limited; street lighting, constant current transformers, fixtures and control equipment, to the Canadian General Electric Company.

Mr. Fred Landon, electrical dealer and contractor, of Whitby, Ont., has recently opened an up-to-date store in that place. He will handle a full line of fixtures and appliances and is also going to go after the radio business. Mr. Landon reports business as very satisfactory just now.

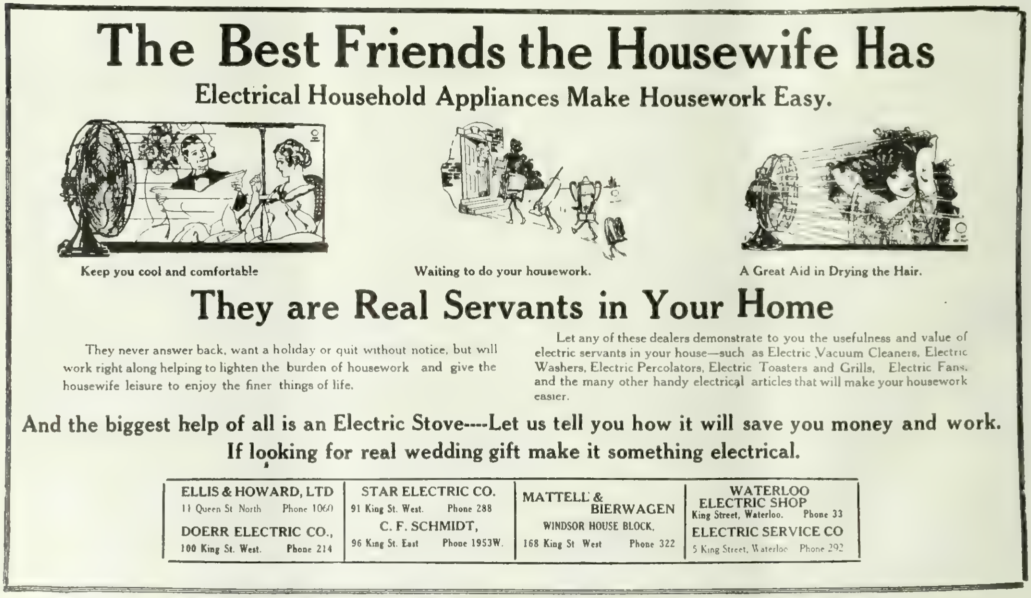
> **"We speak of the wealth of our mines, when, as a matter of fact, our best mine—water power—is above the ground, and the prosperity of the state depends upon this and the people to use it."**

Electrical Space Heater of Wide Application

An electric space heater that has many possible applications in industry, business, and the home and that can be installed by anyone is manufactured by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

This heater, which is made in many sizes and in several wattages and voltages, can be used for heating metal, heating water tanks, baking and drying in ovens, heating presses, rolls and tables, heating isolated rooms and booths, ripening fruit, protecting windows from frost, drying foundry moulds, warming garages, drying clothes in winter, or wherever the temperature required does not exceed 800 degrees Fahrenheit.

For general air heating purposes, such as the warming of isolated rooms, booths, crane cabs, elevators, and garages, the heater may be mounted on angle iron frames, held in place by screws or bolts, and protected by wire screening. For heating metal tanks, pipes, and hot tables, the heaters are fastened against the metal surface and covered with heat insulating material.



The Best Friends the Housewife Has

Electrical Household Appliances Make Housework Easy.

Keep you cool and comfortable

Waiting to do your housework.

A Great Aid in Drying the Hair.

They are Real Servants in Your Home

They never answer back, want a holiday or quit without notice, but will work right along helping to lighten the burden of housework and give the housewife leisure to enjoy the finer things of life.

Let any of these dealers demonstrate to you the usefulness and value of electric servants in your house—such as Electric Vacuum Cleaners, Electric Washers, Electric Percolators, Electric Toasters and Grills, Electric Fans, and the many other handy electrical articles that will make your housework easier.

And the biggest help of all is an Electric Stove----Let us tell you how it will save you money and work.

If looking for real wedding gift make it something electrical.

ELLIS & HOWARD, LTD
11 Queen St North Phone 1060
DOERR ELECTRIC CO.,
100 King St. West. Phone 214

STAR ELECTRIC CO.
91 King St. West. Phone 288
C. F. SCHMIDT,
96 King St. East Phone 1953W.

MATTELL & BIERWAGEN
WINDSOR HOUSE BLOCK,
168 King St West Phone 322

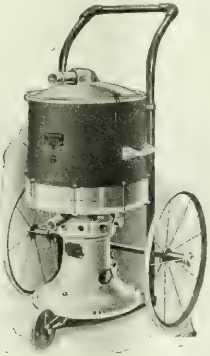
WATERLOO ELECTRIC SHOP
King Street, Waterloo. Phone 33
ELECTRIC SERVICE CO
5 King Street, Waterloo Phone 292

Kitchener and Waterloo are doing good publicity work—Effective because they are working together

The Latest Developments in Electrical Equipment

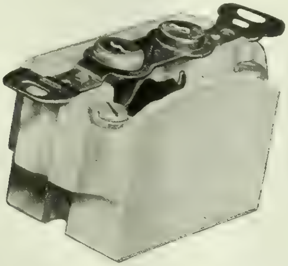
A Portable Vacuum Cleaner

A vacuum cleaner with some interesting features has been placed on the market by the Invincible Vacuum Cleaner Manufacturing Company, Dover, Ohio. This machine is equipped with a Westinghouse, 3/8 h.p. universal motor and a two-stage turbo fan running in ball bearings at 5,000 r.p.m., producing a vacuum of 33 inches of water. It handles from 90 to 100 cu. ft. of air per minute under varying conditions. The machine uses a dust separator of an easily removable type. An essential feature of the machine is its portability. The dust receiver and motor are mounted upon an iron frame which in turn is carried on two 16-inch rubber tired wheels, enabling the operator to easily move it around. Various attachments are supplied and include extra lengths of flexible cord and suction hose. It is claimed that the cleaner can be adapted to all kinds of work, such as that of cleaning floors, draperies, upholstery and bedding; a brush or felt attachment has been supplied for tile and wooden floors.



Locking Flush Switches

The Canadian General Electric Co. Ltd., are manufacturing an additional line of 5A, 250V single pole, double pole and 3 way locking switches to their standard line of flush push button switches. This has been accomplished by the adaptation of their sturdy and reliable standard switch mechanism to a metal key operating the rocker arm instead of the usual moulded push button stems. The switch blades are positively and safely insulated from the switch mechanism so that there is absolutely no danger of the key becoming alive in any way or at any time. These switches are designed to be installed with standard push button switch plates. One operating key is furnished with each switch with the intention that this key is to be entrusted only to an electrician or authorized person who has charge of lighting public buildings or halls where locking switches are installed.



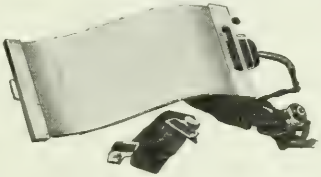
The importance of the use of locking switches is often underestimated from a safety standpoint but the value of using these switches for controlling lights in dark passageways, hallways, dark or dangerous stairs, vaults, lavatories, etc., can be readily understood. The imperative use of the key prevents unauthorized or uninformed persons as well as mischievous children from turning off lights which for safety sake should remain burning or conversely turning on lights which are required to be out except for certain occasions.

Electric Glue Pot With Rheostat Control

A glue pot with a rheostat control which permits an almost unlimited variation in temperature has been developed by the Westinghouse Electric & Manufacturing Company. The temperature of this new pot can be changed to meet different conditions, such as room temperature, climatic conditions, different grades of glue, or different kinds of work. The possibility of an unstable temperature, a frequent condition when gas is used for heating, has been eliminated, a better grade of work is possible, and the removal of a cause of time waste are some of the advantages from the use of this product. The addition of the rheostat does not deprive the user of any of the advantages of the electric glue pot. It still remains portable since the rheostat can be laid on a bench or shelf, the cord from the rheostat to the glue pot being long enough to permit ample movement for ordinary bench work.

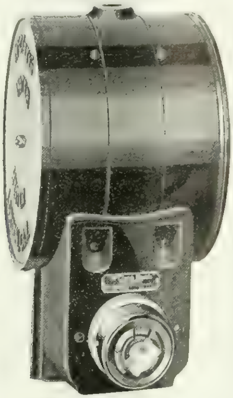
Flexible Heating Pad

The flexible heating pad illustrated herewith is manufactured by the Ingersoll Electric Products Co., 109 W. Austin Ave., Chicago. A description was given in our June issue. A number of claims are made for this pad; it is said that it may be used with wet or damp applications, in any position, and fastened to the body in any manner.



A New Electric Water Heater

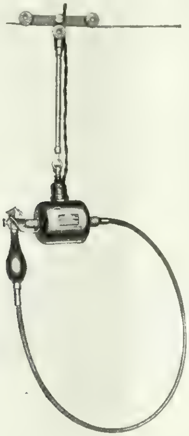
The McClary Manufacturing Company, Head Office, London, Ontario, have recently placed on the market an electric water heater so designed that it may be readily attached to the ordinary household boiler. The construction is such that any electrician can make repairs or adjustments that become necessary from time to time and in case of trouble, the unscrewing of one bolt will remove the cast iron casing. Standard elements are used on the heating units.



The steel plate at the bottom of the wire box can be removed and the necessary knockouts removed, for either open wire, or conduit connection. Connection is made to the ordinary tank with 3/4 inch galvanized iron pipe. The manufacturers emphasize the simplicity of the contrivance, and claim that the coils, bushings, wiring, etc., are all of the highest grade material. The heater is supplied for 110 volts, 220 volts and 110-220 volt three wire.

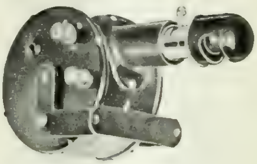
An Electric Hair Cutter

The A-C Electrical Manufacturing Company, Dayton, Ohio, is marketing an electric hair cutter which they claim to be free from vibration and noise. The cutter is equipped with an internal gear-reduction, universal motor, which will operate on all standard currents, including 32 volts, d.c. A special tension device, used to regulate the bearing of the blades, keeps the proper tension, and prevents hairs from dodging between the blades. It is claimed by the manufacturers that there can be no head of hair too heavy for these blades, as a perfect bearing effect is said to be obtained by a special arrangement of the teeth in the upper and lower blades. The curved face of the lower cutting blade enables the barber to cut close or long with only one set of blades. A reduction of working parts is obtained by a direct drive from the motor to the blades.



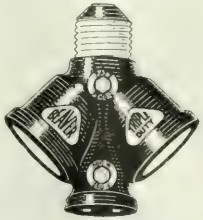
A Trouble Finder

The motorist needs a portable light in case of breakdown, and this want is met by the Cincinnati Specialty Manufacturing Co., Inc., 1907-17 Powers St., Cincinnati, Ohio. Their product consists of a reel, 3 inches in diameter and 2 inches wide, and an extension of 12 feet of reinforced cord, which enables any part of the car to be reached. Through a movement of the attaching arm, the reel is readily adjustable so that it can be placed in any desired part of the car. An automatic lock is used to hold the cord securely at any point. A slight pull releases the lock and the cord is then automatically rewound on the reel. Attachment is readily made to any car by two bolts.



A Three Connection Socket

A new socket, which does triple duty, has been placed on the market by the Beaver Machine & Tool Company, Inc., Newark, N. J. The socket allows of three connections in the space occupied by the ordinary double duty socket; there are many cases where it is desired to have two lights and a household appliance connected to the same outlet, and this socket meets the demand. The manufacturers claim that materials are of the highest grade throughout; the case is highly polished and it is said that its ease of installation and neat appearance make this device suitable for any room in the house.



The advantages derived from arc splitters in conjunction with the magnetic blow-outs of contactors are explained and illustrated in a publication, known as Leaflet No. 3429, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Electric Railways

British Columbia Electric Railway Company Changes System of Operation Overnight

Few street railway superintendents have been faced with the situation which confronted the officials of the British Columbia Electric Railway Company in Victoria, B. C., in the closing months of the past year. The government, in the early part of the year, announced that the long delayed action of changing the road traffic rule from left hand to right would take effect on the first day of January 1922, and about the beginning of September the management issued instructions that by the same date all cars of the local system were to be in shape for one-man operation.

Negotiations leading to this latter decision had been in progress for some time previously, the company having sought and obtained the approval of both the municipal authorities and the Provincial Government on the question of reducing their operating costs in this manner, it being pointed out that it was becoming quite impossible for the service to continue in operation, with the heavy annual deficit which for some years had been in evidence. The schedule of fares had already been revised and a standard 6 cent fare established, but this in itself was not sufficient to relieve the situation and the proposed reduction of operating costs was shown to be essential.

As the system had to be operated up to midnight of December 31st under the old rules, it is apparent that a good deal of ingenuity had to be exercised in so arranging the work of changing over that as much as possible would be accomplished before that date without taking all the transformed cars completely off the road. In view of the intention to change to one man operation, however, the company placed on order ten standard Birney safety cars, and as delivery of at least three of these was anticipated before the date for the change over, the situation was relieved to that extent.

Two General Types

Leaving out of the question the Birney safety cars, which are a new type on the Victoria system, the company operated two general types of cars in the city for passenger service, sufficiently described for present purposes by the designations "Double-end" and "Single-end." The latter type is of course operated on routes where a loop or wye makes reversal of the car possible for the return trip; the former are in use where such facilities do not exist. Both are a heavy type of double truck car, with a total capacity of about 70 passengers.

As a preliminary to entering on the full programme of work, two cars were brought in to the barn early in October for experimental purposes, so that some idea might be obtained of the time that would be required to make the changes, and definite plans laid for completing the programme in time. It was found that 25½ days, with a crew of about twelve men, were required to complete the work on the double end type. The other experimental car was of the single end type and took 37½ days, but was not regarded as a fair test, as this particular car had been in collision with some heavy fire-fighting apparatus and a great deal of repair work unconnected with the change-over had to be accomplished as well.

Increasing the Efficiency

The time required for the work was later cut down about two-thirds, which was partly due to the growing efficiency of the crews engaged on the work, and partly to the fact that on the first cars a good deal of changing about was necessary, as well as the preparation of templates and working schedules for the bulk of the programme to follow. The double end cars had to be changed from left-hand, rear entrance, to right hand, front entrance. The changes in car structure necessitated by this were quite comprehensive, and included the complete removal of the two bulkheads which had partitioned off the drivers' and conductors' compartments. The old exits were entirely closed up, and a window with sliding sash installed on the left side next to the operators' seat. New doors were installed at the right side, of the sliding and folding type, operated by pneumatic control in place of the former hand control. The lighting system was entirely revised, and step lights were installed over each entrance door, with box shields to keep the light from the operators' eyes. No lights were placed in the vestibules, and spring curtains were arranged to shield the operator from light from the body of the car.

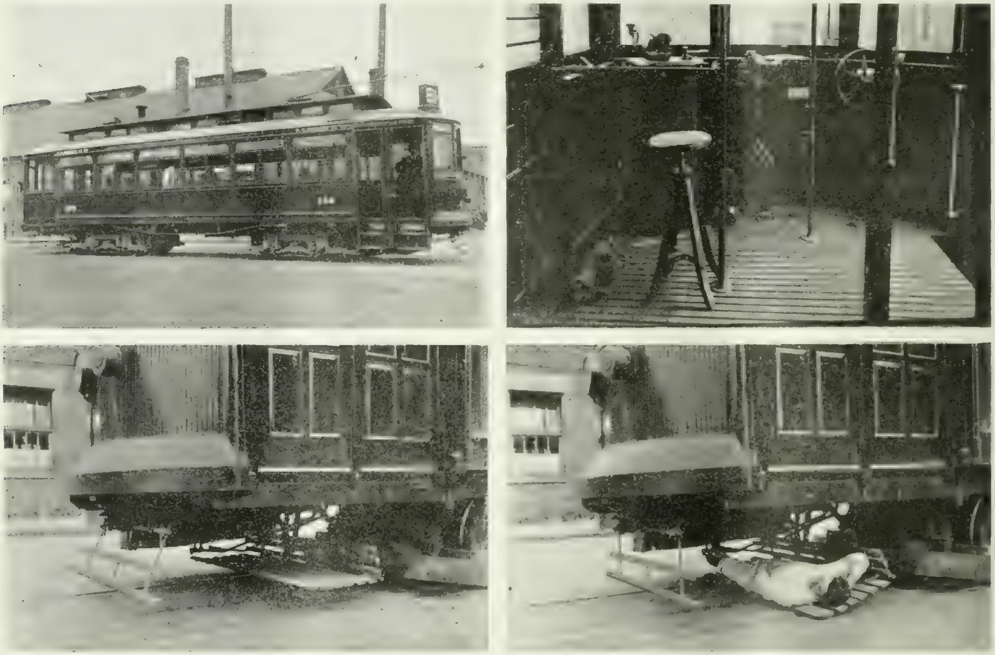
The single end cars were similarly arranged as far as concerns the driving or front end. The doors were made identical with those installed on double enders, and front bulkhead removed. No change was made at the rear end, however, with the exception of placing a seat in the compartment, which is now in use as a smoking compartment. The rear exit door, as it is now, was originally the front exit and the rear compartment under present conditions was previously the drivers' compartment and the front of the car. The rear exit is purely for emergency use, and under normal conditions remains locked pneumatically. The old controller and straight air brake valves remain at this end of the car, and are used for handling the car around the barn and yards when necessary.

Standard Safety Equipment

All cars were formerly equipped with what is known as the straight air system of braking. With a view to bringing the system completely up-to-date from the safety standpoint, all cars are now fitted with standard safety equipment, Westinghouse Type 28M Motorman's brake valve, with controller pilot valve and emergency valve. This equipment is so arranged that an emergency stop can be made by only two motions on the part of the operator. The first is of course the controller handle motion which cuts off the current. The second is the brake valve motion to extreme right hand position. The sequence of operations then carried out automatically by the braking mechanism is, 1st, track sanding, 2nd, full tank pressure to brakes through the operating cylinders, 3rd all exit, entrance and emergency doors unlocked so that they may be opened by hand.

The so-called "dead-man-control" is also provided for. In the event of the operator leaving his post under any contingency, such as the imminence of a collision, complete automatic control at once takes place, and the car brought to an emergency stop. The sequence of operations under these conditions is as follows:—1st, pressure air is admitted to a small cylinder and operates a piston which trips the circuit breker and cuts off all current. 2nd, tracks are sanded, 3rd, brakes applied with full reservoir pressure, and 4th, all doors unlocked as before. While the sequence is maintained as described, the whole operation is practically instantaneous and constitutes a safety device which has already on several occasions proved its efficacy to the complete satisfaction of the officials of the system.

The contingency of a collision which might destroy the valves and piping at one end of the car is also provided for, by means of an emergency valve and double check valve which are located in the centre of the car where furthest removed from possible damage. A serious leak or breakage in the pipe system will cause these to operate and bring the car to a stop as before.



Left above—Right hand operation, sliding and folding doors in open position. Right above—Control arrangement. Below right and left—Life Guards

New Fenders

In addition to all the changes noted above a new type of fender has recently been made standard on all cars of the company's system. This is the "H. B. Lifeguard" fender, which consists of two principal parts. The fender proper is underneath the car, and under normal conditions hangs with its lower edge about 6 inches above the track. A small fender hangs just under the front of the car body however, and acts as a trigger to the fender proper, when any person or other obstruction is struck by the car. The large fender is then automatically dropped until its edge rests on the rails, and picks up the body in safety. This feature of the equipment has also given great satisfaction since its installation, and has been found to act with great certainty when the need arises. As an example of its sensitiveness it is interesting to note that for some time considerable trouble was experienced due to the fender operating without apparent cause. This trouble persisted for some weeks, and then stopped, and the reason was not discovered until the trouble was found to be again as bad as ever for a few days in coincidence with a stiff breeze. It was then established beyond a doubt that the fenders were dropped by the action of the wind upon the trigger piece, and it has become necessary to reduce the exposed area somewhat so as to obviate the inconvenience caused in this manner.

A new signal system for stop signals to the operator has also been installed recently. The old system was simply the standard electric buzzer operated by dry cells. The new system, which has proved in practice much more reliable, is the Faraday High Voltage Signal system, and takes current direct from the trolley through a resistance.

Capital Investment

Some idea of the capital investment represented by the changes may be obtained from the fact that the alterations to rolling stock alone, apart from track and overhead work, amounted to about $2,000.00 per car. About 100 extra men of various trades were employed by the company during the last three months of the year and a reduced force until the end of March, when the work was practically completed. Although a great deal of work had been done previous to December 31st., much naturally remained in completing the tracks and overhead work, repair to roads, etc., and this work was carried out at considerably reduced pressure, as the system was put in condition to operate temporarily during the old year. Until March however, two men were kept on as crew on all cars, and in this transition period the permanent force was organized under the new conditions.

It was found that not all of the men previously employed either as motormen or conductors were able to adjust themselves to the changed conditions. The requirements are naturally somewhat exacting, as the operator has the responsibility of running his car, the collection of fares, which are deposited by the passengers in fare boxes of a special pattern, sale of tickets and making change, and general supervision of passengers from the safety standpoint.

And apart from all these requirements, the company was interested in having men in charge of the cars who would maintain a pleasant relationship of the company with the public, instead of antagonizing people by nervous or discourteous conduct. It is greatly to the credit of the company that all this was accomplished without hitch or serious accident of any kind. The mechanical and engineering details of the work were under the direct supervision of Mr. C. A. Cornwall, M.E.I.C., assistant superintendent.

London City Council to Regulate Bus Licensing

The London City Council will shortly take up the matter of a proper regulation and licensing of buses. It is claimed by some of the Aldermen that it is unfair to make the street railway pay its share of the cost of paving on streets where its lines run and then permit buses to run with only the payment of an insignificant license fee. It is also suggested that every bus owner be compelled to carry an insurance policy for not less than $25,000 to cover damage done by him to life or property in case of accident.

Cost per Passenger is Less

At a recent meeting of the St. Thomas, Ont., City Council, Manager Johns, of the street railway, submitted a comparative statement of car mile costs for 1922 and 1921, showing that the cost of carrying each passenger per car mile this year has averaged 7.1 cents as against 10 cents in 1921. The passengers carried per car mile during June of this year averaged 3.51 as against 2.21 in June 1921; the revenue per car mile for June 1922 was 11 cents and 14.6 cents in June 1921; the expense per car mile in June 1922 was 24.25 cents per car mile and in June 1921, 22.5 cents.

"The expense per car mile is greater than in 1921 since the present operation necessitates fewer car miles and the fixed charges, debentures, payments, interest, etc., are the same," the manager reported. "However the passengers carried are more in proportion to the mileage operated than last year and the cost per passenger has materially decreased."

Better Returns

Weekly returns of the operation of the Edmonton street car system indicate, according to Commissioner Yorath, that that utility is showing a constant increase in revenue and in the number of passengers carried comparing the figures with those for the same periods last year.

In recent week there were 222,083 passengers carried as compared with 214,426 during the corresponding week last year. There is a gradual increase of nearly $100 a day in revenue. There are 40 cars in regular and constant operation as compared with 35 at the same time last year.

Opposes Increased Fares

On last year's operations the Ottawa Electric Railway showed a profit of less than 5 per cent.

Major Burpee, says the company is strongly against the idea of raising the nickel fare on the ground that street car riding would become to many a burdensome necessity.

Improved Financial Position

The financial position of the Nova Scotia Tramways & Power Company is reported to have materially improved during the last six months, and through steadily increasing earnings and decline in operating expenses the company is working into a strong position.

On the Mount Pleasant line the Toronto Transportation Commission is operating its first Trolley Bus, as illustrated

Current News and Notes

Collingwood, Ont.

Mr. M. A. MacGillivray, of Collingwood, Ontario, has been getting plenty of wiring business lately. He has just about completed the re-wiring of the Public Library and has secured several new contracts which include that of the New Empire Theatre, and a remodelling job on the Dominion Hotel. This latter building is being converted into apartments, with store and office included in the same building; the job calls for 9 electric ranges, and necessitates the installation of 13 meters.

Cowansville, Que.

Messrs. Buzzell & Lorimer, of Cowansville, Quebec, have recently started in the manufacture and merchandising of radio and electrical apparatus. They report a rush of business.

Hamilton, Ont.

Accepting the legal advice of the City Solicitor, F. R. Waddell, K. C., that the new Hydro-radial Act supersedes all other by-laws heretofore passed, and that the latter are, therefore, declared null and void, the Board of Control of Hamilton, on July 6, resolved that the city should request the Hydro-electric Power Commission of Ontario to return the $6,478,928 in debentures which Hamilton deposited as a guarantee against a deficit in connection with the operation of the proposed Hydro-radial from Port Credit to St. Catharines.

Langley Prairie, B. C.

An increase in the demand for telephone service has resulted in the installation of a 15-pair cable which will add considerably to the capacity of the local service.

London, Ont.

Initial steps were taken by the Finance Committee of the London city council recently to take over the properties of the London Street Railway. A resolution was introduced by Mayor Wilson, calling for the appointment of a commission to go into the whole question and make a report within three months' time.

Montreal, Que.

Mr. Eugene Vinet, who has acted as secretary of the Canadian Electrical Association for a number of years, during which time very marked progress has been made in this association, has resigned and been succeeded by Mr. Louis Kon. Mr. Vinet has moved to Chicago. Mr. Kon is a well-known figure in the Montreal district, where he is secretary of the Electrical Co-operative Association, Province of Quebec, and of the Contractor Dealers' Associations of that province. His appointment as secretary of the Canadian Electrical Association should prove to be a step in bringing the different electrical interests into more intimate cooperation.

New Liskeard, Ont.

In our last issue we published a preliminary report on the Matachewan Power Company, Ltd., at Indian Chute, on the Montreal River. Sutcliffe & Neelands, engineers in charge of this work, now advise us that contracts have been awarded as follows: Boving Hydraulic & Engineering Company, waterwheel and hydraulic equipment; Canadian Westinghouse Co., generator and electrical apparatus; English Electric Co. of Canada, transformers; Northern Aluminum Co., transmission material.

Ottawa, Ontario.

The Canada Gazette announces the incorporation of the Radiola Company of Canada for the purpose of manufacturing and dealing in wireless equipment of every description. Capital stock $100,000. Head office Ottawa.

Paris, Ont.

Since 1914, the electrical power used in Paris, Ont., has increased from 158 to 671 horsepower.

St. Catharines, Ont.

Mr. Arthur J. Flowers has recently taken over the interest of Mr. Fred Muller of the Muller-Flowers Electrical Repair Co., and is re-organizing the business which will in future be known as the Canadian Armature Works, specializing in the manufacture of coils for motors, and all types of electrical equipment, also street railway coils and general electrical repairs.

South Vancouver, B. C.

The South Vancouver Council, on June 29, recommended the signing of a contract for street lighting with the B. C. Electric Company. The signing of this will mean the scrapping of the present arc lights, and the substitution of nitro-tungsten lamps.

Toronto, Ont.

The Ontario Gazette announces the incorporation of Brooke and Bastedo, Limited, with a capitalization of $40,000. The new company are licensed to carry on the business of electrical contractors and builders and to deal in all kinds of electrical appliances, etc. Head office, Toronto.

If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Vancouver, B. C.

The East Kootenay Power Company is issuing $2,000,000 of 7 per cent, first mortgage, sinking fund gold bonds. The offering is being made at 97½ and carries a bonus of 2½ shares of no par value with each $1,000 bond.

Welland, Ont.

Mr. H. F. Scherer, for a number of years manager of the Municipal Electric System in Smiths Falls, Ont., recently resigned to accept a similar position in Welland, Ont., where the greater industrial development should offer Mr. Scherer a wider scope for his ability and ambition.

Winnipeg, Man.

Manitoba Government Telephones monthly report for May submitted by Commissioner Lowry, shows a surplus of $5,568.72 as compared with a deficit of $71,205.49 for the corresponding month last year. The deficit for the year 1922 has been reduced to $14,000 against a deficit of $369.146 for the corresponding six months of 1921. The total revenue for the month was $264,720.06. Expenditure $153,111.81.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Radio Legislation

It is not widely known, we believe, that according to an act of the Dominion Government, there is a penalty attaching to all persons operating radio equipment without a license. The Government has not taken proceedings under this act, we understand, as it is their desire to give the general public every opportunity, of their own free will, to obtain a license. They are, however, appointing radio inspectors in the larger cities and districts of the Dominion, and when all these appointments are operating it is expected there will be comparatively few licensed stations. Licenses may be obtained from all post-masters.

The importance of licensing radio operators is evident. In the first place, there is no other means of obtaining statistical information on the number and size of radio stations in Canada. Further, it is easily seen how important it may be for the government to know the location of all receiving and sending equipments. In case of international complications, for example, it would be absolutely essential that the government should be able to locate and control all such equipments.

The suggestion has been made that retailers should be held responsible for the purchase of licenses and should be required to refuse to sell equipment to other than license holders. This would involve considerable inconvenience, however, and it is hoped the general public will be sufficiently seized of the necessity for co-operation to make the necessary expenditure of one dollar. No doubt, in due course, the government will vigorously enforce the act.

The wirelesss situation in Great Britian seems to be somewhat more complicated than is the case in Canada and the problems created have been productive of legislation which it is interesting to examine as a model upon which our Dominion radio laws may to some extent be based.

Wireless licenses are subject to such terms, conditions and restrictions as the Postmaster-General may lay down, and penalties are provided for the contravention of the regulations or of the terms of a license. Three specific offences are created, viz., the sending by wireless telegraphy of a message of an offensive character, or a misleading signal as to a vessel in distress, or improperly divulging the purport of any message. For these offences a fine not exceeding £10, or imprisonment for 12 months, may be inflicted. Apparently, the old distinction as to experimental licenses is to disappear, and the Act is to be applied to aircraft (with the necessary modifications) and to visual or sound signalling stations for communicating with ships at sea. Provision is made for the control of wireless telegraphy, or of visual or sound signalling apparatus in cases of national emergency.

This legislation reflects a general loosening of the official grip upon wireless in England of which the latest development has been the postmaster-general's plan for the encouragement of amateur wireless operators by permitting a number of leading manufacturers to broadcast at certain hours. This has hitherto hung fire despite the enthusiasm of amateurs.

One of the objections raised by the manufacturers was that they would secure no return from the expense incidental to broadcasting, while foreign makers would be likely to under-sell them with apparatus.

Postmaster-General Kellaway has met these complaints by the announcement that the British market for a period of two years must be restricted to apparatus of British manufacture.

Those Cheeky Electric Merchants! Now Robbing the Jewellers

At a recently held meeting of the Scottish Association of Watchmakers and Jewellers, the president (Mr. Broadbent) said he was pleased to see a reference in the annual report to lectures concerning electric clocks being given in connection with the watch and clock making classes at the Glasgow Royal Technical College next session.

There was no doubt (he added) that in the future they as jewellers should learn as much as they possibly could about electric clocks because **there was a danger that they might allow this trade to get into the hands of electricians and ironmongers.** It was now their time as watchmakers and clockmakers to come forward and claim that they were able to tackle these things, and he personally believed that there would be a great avenue of business opened up to them in this direction in the future. By degrees they were finding certain things slipping out of the jewellers' hands, which should not do so.

Electric appliances were one of the things of the future and while at the present time they occasionally sold a spirit kettle, it was worth considering how many electric kettles were sold by other dealers for each kettle that they sold. It was the same with electric clocks—how many jewellers dealt with such clocks? In his opinion there was no reason why the jewellers should not come forward and capture this electrical trade. He did not suggest that they should sell any kind of rubbish, but he thought that many of them would be able to work up a good trade in electrical appliances of a good class character. He thought it might be a good idea if some lectures were given at the Royal Technical College or in their own association rooms on electrical heating appliances, and he threw out that suggestion for what it was worth.

Electricity (included Mr. Broadbent) was **not a very difficult thing to learn about,** and in addition to electric clocks he would also like to see them stocking electric heating appliances, electric table ware, etc. He saw no reason why their own electro-plate manufacturers should not manufacture such things as well as foreign firms. He was sure that they could turn out a decent article to compete favorably with any other. (Applause.) He had much pleasure in now moving the adoption of the annual report.

Mr. James Chalmers (in seconding the adoption of the report) said he hoped that the interesting remarks made by Mr. Broadbent would duly appear in the trade press, and would be read by all parties interested. Personally, he agreed that it was **a great pity that so much trade which could easily be handled by jewellers was now getting into the hands of ironmongers, electricians and others.** There was no doubt that they as jewellers and watchmakers had a splendid opportunity for dealing with electrical appliances, and he thought that Mr. Broadbent's remarks should be kept in view by them all.

The Chairman: I thank Mr. Chalmers for these remarks, and I can only again add that I believe there is a big industry to be tapped by dealers as far as electricity is concerned. Why should we let the ironmongers and all sorts of other people sell these things without selling them ourselves? I personally see no reason why we as jewellers should not be able to handle the trade in electrical heating appliances.—Electrical Industries (England).

Programme of the "Electrify Movement" Embraces a Wide Range of Activities

The campaign recently initiated by the National Electrical Light Association, and known as the "Electrify" movement, is taking more definite shape. For a time it appeared as if a certain amount of overlapping of activity of the various electrical organizations would result, but it appears that these different organizations have got together and arranged for definite fields, for example, certain definite work is being delegated to the Elecerical Jobbers Association, to the Electrical Supply Manufacturers Association, to the National Association of Contractors and Dealers, to the Society for Electrical Development, and so on. For example: The Electrical Supply Association will undertake the collection of data and information regarding the situation in 15,000 cities and towns served by electricity, and a questionnaire will be drawn up and sent out for this purpose.

In discussing the activities of the "Joint Committee for Business Development" for the coming year, the five following definite activities were outlined:—

1. A complete roster of the commercial men in central stations in each community.
2. Assist in every way possible the organization of Committees, Electrical Clubs, Co-operative Associations, Boards of Trade or Electric Leagues in all cities and towns in America.
3. Appearance of members of the Joint Committee at various conventions and meetings and their assistance in the field activities.
4. Development of a bibliography of papers presented before the Commercial National Section during the last ten years, this material to be used to assist local activities and informing those employed in the electrical industry.
5. Issuance of specific information and data to be published as chapters of the five guide book subjects.

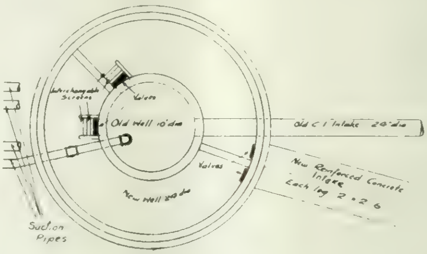
The first chapter of each of the five guide books has already been issued by the Committee, viz.—"Organization," "Lighting Appliances," "Wiring" and "Industrial Power."

An Intake Well That Can be Cleaned Without Shutting Down

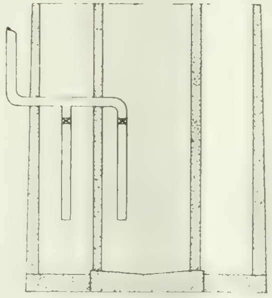
In every municipality there is generally some feature in the power supply that gives more or less trouble. The city of Saskatoon has not been exempt, but its engineers have successfully solved their particular problem.

The power plant is situated near the South Saskatchewan River and its equipment embodies Babcock & Wilcox boilers and turbo-generators. Each turbine has its own surface condenser and the necessary air and condensate pumps. The water for the condensers is pumped from the river .

The first installation included an intake well, which drew its supply from a 24-inch intake pipe extending into the river. With increased demand for water, this well proved inadequate—there was trouble on account of water shortage and because of the frequent necessity of cleaning the well and condensers, due to large deposits of sand and foreign matter.



PLAN



SECTIONAL ELEVATION

INTAKE WELL

The problem was solved by constructing an outer well as shown in the drawing. It was divided into two halves, each half separately fed from a new duplicate intake pipe. Gate valves were installed at the entrance to the outer well and openings for valves and screens were made in the inner well wall at a point furthest away from the intake. Suction drop legs were also installed so as to pull water directly from the outer well when desired.

This construction made it possible to draw water from any one of the three wells. The flowage through either half of the outer well is at low velocity. The result is that the sand is deposited, the screens hold up the foreign matter, and accumulated deposits can be removed without affecting continuous operation.

The Application of Electricity in the Manufacturing Industry---4

A General Analysis of the Conditions in Pulp and Paper Mills Embracing a Description of the Apparatus that has Been Developed to Meet the Peculiar Demands of This Industry*

Electricity in the form of power first became a factor in the pulp and paper industry about 1900—and during the past twenty years the advancement of electrical development in that industry has been remarkable. From the first major installation of less than one thousand kilowatts capacity, the demand of the individual mill has increased until there are several installations of approximately ten thousand kilowatts, and a few still larger, the average capacity being far in excess of the first important development. We can attribute this advancement principally to the two following reasons:

(1)—Power can be electrically distributed and applied throughout the mill and with greatly increased economy over former methods.

(2)—The development of electrical equipment suitable for the service demanded.

The major advantages of applied electrical power over former methods are briefly as follows:

1st—Centralization of power generating and distributing equipment under the control of a few skilled operators.

2nd—Two or more generating units may be installed, thus preventing a complete shut down in case of trouble. Further, more economical operation is a result at partial loads.

3rd—The power from several small developments may be combined and successfully applied.

4th—The manufacturer's plant may be placed in the most advantageous position, irrespective of location of power plant.

5th—The mill buildings may be arranged to reduce to a minimum, handling of the product, without reference to power supply, thus reducing conversion costs.

6th—Extensions or additions to present mill where power supply exhausted is allowed through ability to secure additional power from outside souces.

7th—Elimination of unnecessary line shafting and belting reduces friction loss and personal hazard.

8th—Equipment may be operated to secure maximum production with minimum power consumption.

9th—Distribution can be so arranged that troubles in one department will not interfere with another.

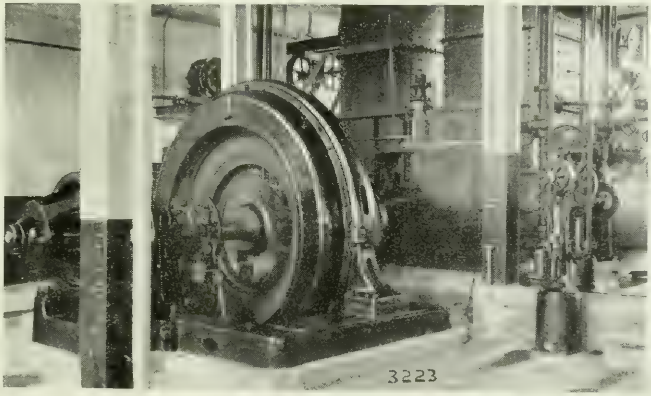
10th—With proper sub-division of distribution, power is consumed by a department only when in operation, therefore greater economy of its use is possible.

11th—The power consumption of an individual motor, or for a particular operation may be accurately determined at any time or continuously, for the purpose of ascertaining cost.

12th—A cleaner, better and more uniform product is a result.

Losses High on Indirect Drive

The majority of pulp and paper mill equipment, in earlier years, was mechanically driven by water wheels or a combination of steam and hydraulic units, power, as a rule, being transmitted to the various machines through a complicated system of gearing, line shafts, rope drives or belts; the prime mover was direct connected in but a comparatively few of the many different drives. The friction loss for such drives is usually assumed to be about 15 per cent and this figure is approximately correct under ideal conditions, such as correct shaft and bearing proportions, accurate alignment and proper belt tension. Ideal conditions, however, cannot be maintained and the friction loss,



One of a battery of three 1400 h.p. 220 volt. 232 r.p.m., synchronous motors driving magazine grinders in Brompton Pulp & Paper Co.'s mill East Angus, Que. Installation made in 1920.

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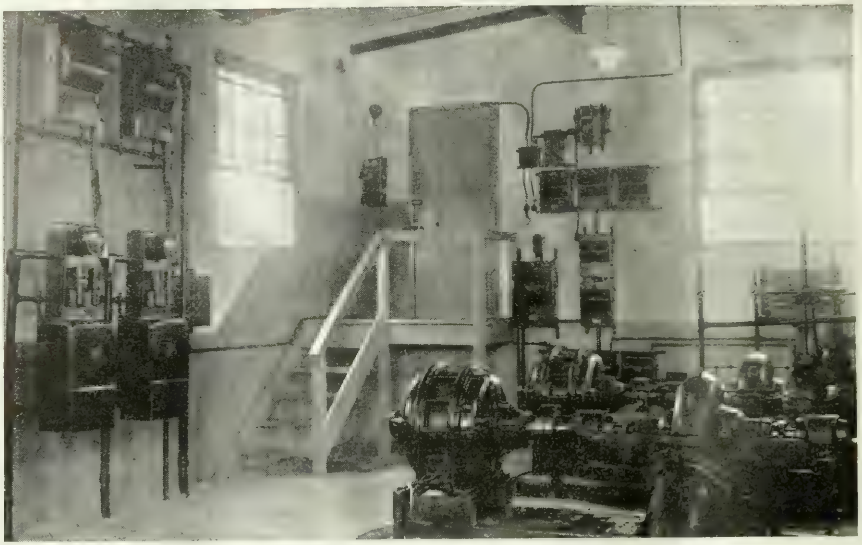
*For certain information contained in this article we are indebted to R. W. Leeper, Power Engineer H. S. Taylor Ltd., Montreal



Low Head Pump House, Provincial Paper Mills, Port Arthur. Two 75 h.p., 550 volt motors, direct connected. An example of thorough electrification including power, lighting and signalling equipment.

while indeterminate, is always greater under load, and is usually higher than the assumed figure of 15 per cent, a safer estimate for this loss being at least 25 per cent and it may even be higher

The First Motor Drives

The first motor drives naturally followed closely the former methods, the motor replacing the engine or water wheel, as the case might be, the mechanical transmission to a great extent being retained, and often where installed in existing mills the former prime mover was held in reserve to pick up the load in case of trouble. With the growing appreciation of the reliability, economy and high efficiency of motor drive the applications increased, the requirements of individual machines were accurately determined and special equipment was developed suitable for the service to be performed.

Two Main Types of Drive

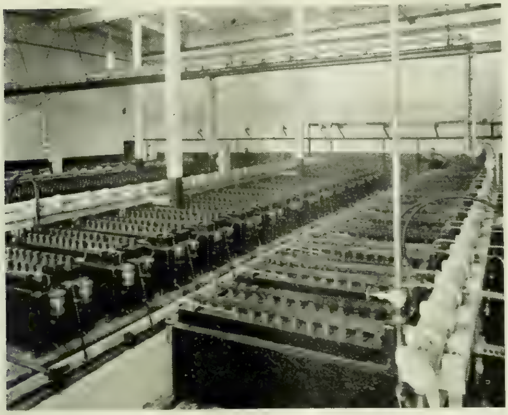
In the application of motors, two systems are in general use which are commonly known as "group" and "individual" drive and for each installation the relative merits of the two systems must be determined. Group drive is usually selected where there are a number of small units, all of which must run at the same time, the shut down of any one affecting or interrupting the process. Such a number of units can be grouped and driven from a line shaft to advantage, a good example being the constant line of a paper machine. Such an arrangement is also preferable for a line of duplicate machines such as wet machines, screens, deckers, etc., where individual motors would be expensive and unnecessary. Individual drive is preferable where the duty is intermittent, or where the driven machine is a complete unit in itself, as power is consumed only when the unit is in operation, and no interference can be caused through operation of other equipment. Super-calenders, pumps, Jordans, and grinders as a rule are in this class. In that it is generally admitted that more minor interruptions to service are caused by trouble with the control equipment, than with the motor itself, especially in the lower ratings, serious consideration should be given to too strict adherence to the principle of individual drive.

Alternating Current Universal

Alternating three phase current has been found, after many years practical experience, best suited for industrial power application and is almost universally selected to-day for the pulp and paper mill. By its use power, either in small or large quantities, can be economically distributed over large areas, it can be readily transformed so that proper voltages are available for various applications, the equipment is simple, and even if operated continuously under extreme conditions, affords maximum reliability and high efficiency with minimum maintenance. The current carrying parts may be totally enclosed, permitting the use of higher voltages without endangering the operators, thus reducing distribution losses and increasing efficiency; the efficiency of a properly designed alternating current installation being at least 80 per cent from the shaft of the prime mover to the driven equipment, not including losses due to long distance high tension transmission lines where required. This efficiency can also be maintained as it is not affected to the same extent by line shaft and belting conditions, as is a purely mechanical system of distribution.

Types of Motor Used

Alternating current motors are especially suited to the service encountered in the pulp and paper industry where reliability is the first consideration, and where the greater percentage of drives are of the constant speed type. The first cost is low, the parts are few in number and built to withstand hard usage, the electrical characteristics are such that high efficiency is obtained over a wide load range, the windings may be impregnated to resist moisture or acid fumes, and for the types most used a commutator is not required, thus reducing materially the fire hazard. For pulp and paper mill drives, three types of alternating current motors are used, commonly known as squirrel cage, wound rotor or slip ring, and synchronous.



Cell Room, Electrolytic Bleach Plant, Howard Smith Paper Mills Cornwall, Ont.

The squirrel cage motor is selected where constant speed with moderate starting torque is required which includes the majority of paper mill drives such as pumps, Jordans, and chippers.

For those drives where high starting and pull-out torque with constant speed is demanded, the wound rotor or slip ring motor is preferable. In this class may be included drives for beaters, conveyors under load, and heavy line shafts. Super-calenders are now being driven with slip ring motors, this application, however, demanding the varying speed type in place of constant speed. Slip ring motors are more complicated and expensive than the squirrel cage type, but for heavy duty this additional expenditure is fully justified.

The modern synchronous motor can be selected for grinders, Jordans and motor generator sets where of appreciable capacity, the proper application and use of which will improve the power-factor, thus increasing the efficiency and capacity of the entire system. It is true that either static or synchronous condensers may be used for this power factor correction, but the initial cost is materially increased thereby.

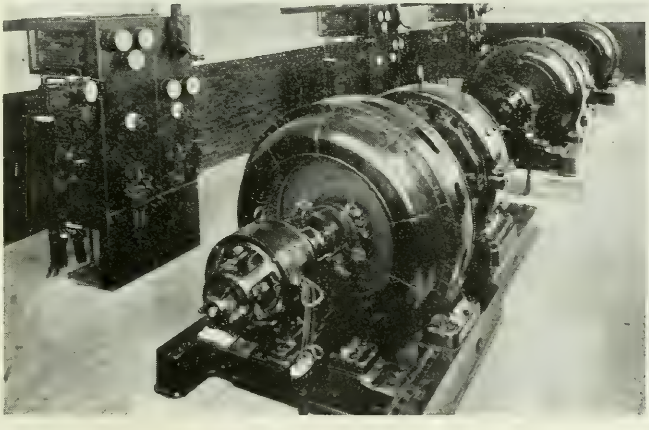
Where Direct Current is Used

Direct current in the average mill is confined to those drives where a wide variation of speed is demanded and to certain electrolytic processes necessitating the use of continuous current. It is usually the case, however, that this direct current is supplied from the alternating current circuit through either a motor generator set or other form of converter.

The use of direct current motors in the mill is generally confined to the variable speed end of paper machines if electrically driven, the winders, cranes and certain finishing equipment where a wide speed range is required with uniform speed at any point regardless of slight load changes. For such application, adjustable speed direct current motors are preferable and show advantages over the alternating current type.

Synchronous Motors

The development during the past few years of synchronous motors of high rating for driving wood pulp grinders has advanced rapidly. In earlier mills, grinders were almost universally driven by direct connection to water wheels, and while this arrangement is unquestionably efficient, its disadvantages more than offset the saving from either an efficiency or initial cost standpoint. With grinders direct connected to water wheel the groundwood mill must be located with reference to the water power, even if completely isolated, therefore entirely unsuited from the manufacturing standpoint or its own operation or that of the conversion plant that may be a part of the development; it is frequently found that the available head is not suitable for developing the standard grinder speed, and lowered efficiency and loss of water must result. With electrically driven grinders, location can be selected irrespective of power source, power units can be selected of the highest efficiency, and what may be the most important of all, grinding capacity is not limited to the one source of power, any outside source being available for enlargement. It is also admitted that the modern magazine grinder, which is coming more and more into



Three 550 volt, 440 h. p., synchronous motors, driving d.c., generators, capacity of 1750 amperes. Power factor of plant raised from 78 to 90 per cent. Howard Smith Paper Mills, Cornwall, Ontario.

general use, can not be successfully operated except electrically, its high power demand and necessity for speed control being unsuitable for direct connection to a water wheel except under very unusual conditions.

Good Power-factor Conditions Required

For the first motor driven grinder installations wound rotor motors were as a rule seleted, the starting characteristics and general development of the synchronous type not being suitable for this heavy duty, although the efficiency and first cost were usually in favor of the latter type. With this grinder application in view, however, together with the demand for synchronous units to improve the exceedingly low power-factor conditions prevalent throughout the industry, this lowered power-factor greatly reducing the capacity of the generating equipment or being the cause of heavy penalties in the case of purchased power, the electrical manufacturer's attention was directed to the synchronous unit with the result that to-day the synchronous motor is usually selected for driving grinders, both of the magazine and pocket type, its uniform speed and general characteristics adapting it for this use as well as for other locations where a single unit of higher rating is demanded.

Steam Engine Efficient for Certain Purposes

Motor drives for the variable speed shaft of paper machines are not common, the non-condensing engine for many years having been the standard installation, and it probably will be for many years to come, from a steam economy standpoint where the entire steam demand is for drying and heating. Under such conditions the steam engine provides an extremely efficient drive and there is little shance for improvement. In mills, however, where the entire power demand is generated with steam or where centralization of power is desired, a motor driven variable line may be operated advantageously, an adjustable speed direct current motor replacing the steam engine and we find to-day many paper machines being so driven.

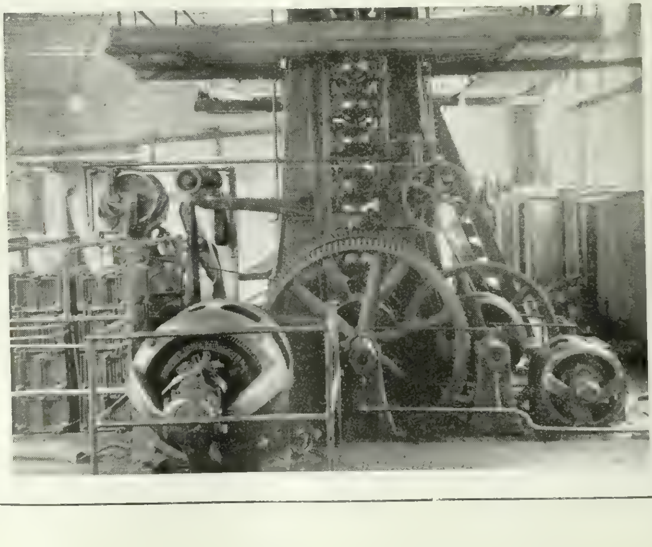
The Adjustable Speed Motor

This adjustable speed direct current motor drive with a speed range selected for the machine that it is to drive, is in many ways an improvement over former methods, as it has, in eliminating many complicated and unreliable speed changing devices, also eliminated varying speeds on the paper machine. It has not, however, eliminated the back line, belts, cone pulleys and gears, or reduced the loss between prime mover and machine, which is often as high as 50 per cent of the total power developed, or did it improve the lack of uniformity between the various sections, to which many breaks can be traced, or reduce maintenance on the back line which is 20 to 30 cents per ton of product.

With the demand for higher and still higher machine speeds, increased production and lower operating costs, the problem of maintenance and successful operation of the variable speed drive became more serious until the limit of former types was reached. For several years electrical manufacturers had been experimenting with various schemes by which it was proposed to drive each section with an individual motor, which was an exceedingly difficult problem on account of the close regulation required between sections often over a wide speed range. At present it can be said that the problem is solved, as there are today three different types of sectional individual drives in successful operation. This development eliminates all line shafting, rope drive, belts, gears, clutches and cone pulleys, and provides maximum reliability with minimum maintenance, high efficiency and perfectly adjusted draw between sections, or is the maximum speed at which the machine may be operated fixed in any way by the limitations of the drive. The sectional drive is applicable to slow speed as well as high speed machines, and while it is not an actual necessity for the slow speed machine, it is the opinion that its installation is justified.

Requirements for Speed Range

For either a single motor or sectionally driven machine, where the speed range is greater than about 3 to 1, voltage control or a combination of voltage and field control should be used, this arrangement requiring an individual generator for each drive, and even where the speed range is such that one generator may be used for two or more machines it may be advisable to install a generator for each machine, to avoid interference to but one unit in case of generator trouble. The generator in this arrangement is usually driven by a non-condensing steam prime mover or coupled in a motor generator set, exhaust steam in the former case being supplied to the dryers, and in the latter this steam be-



75 h.p. slip ring. 550 volt, 750 r.p.m. motor used on stack of calenders. Smaller motor shown used for starting purposes only. Kinleith Paper Mills, St. Catharines, Ont.

ing furnished direct from the boilers or from an extraction turbine if this type of equipment be installed.

Bleeder Turbine Generator Set

For those installations where the entire power demand is generated with steam, or where several machines are electrically driven, the extraction or bleeder type of turbine generator set is especially suited, low pressure steam being available upon demand, and not supplied irrespective of demand as in the case of the back pressure unit. This characteristic is of special value during wash up or other periods or when breaks occur or for other causes the dryer steam is shut off the paper machine. Steam from a turbine is also unquestionably superior to that from an engine for drying and heating purposes on account of being absolutely free from all oil which not only reduces the heat transfer in the driver but is a constant menace when the condensate is returned to the boilers from which the oil cannot be entirely removed by any known method. Before selecting a turbine of the extraction type, conditions must be carefully analyzed as it obviously cannot be used where the demand for exhaust steam is nearly equal to or greater than that due to the load demand.

Auxiliary Equipment

In the field of auxiliary equipment, such as switching, starting and control, developments have been in keeping with the major apparatus. From exposed knife switches and unsatisfactory fuses, the control has been improved until today all alternating current equipment, even of low capacity, can be protected by oil circuit breakers or similar devices with relays of suitable type. Fuses are still installed for cable protection or to take care of abnormal conditions in the distribution system, but they are not, however, depended upon except indirectly to protect equipment. With modern control all current carrying parts are enclosed so that accidental contact, due to careless operation, is practically impossible. New resistance metals and insulating materials have been developed, rheostats, relays, contactors, controllers, etc., made more rugged until these parts give little trouble, even in paper mills, where control equipment is often exposed to moisture, acid fumes, extreme temperature changes, and under the control of an operator unskilled in its manipulation, and under these conditions the continuous operation given shows to a remarkable degree the development that has taken place.

Temperature Ratings

For many years the standard temperature guarantee for electrical equipment was for full load continuously 40° C. rise, with 25 per cent. overload 2 hours, 50 or 55° C. rise, based on an ambient temperature of 25° C. For several years manufacturers of electrical equipment have standardized more and more on a rating of full load continuously 50° C. rise, with no load, based on an ambient temperature of 40° C. (104 F.) The capacity of equipment rated on the 50° continuous basis is approximately 83 per cent. of the former 40° basis. For some time generator and transformer guarantees have been made on the continuous basis, and for motors this guarantee is now becoming common and quotations are usually so based unless otherwise specified.

From the manufacturer's standpoint, there are several good reasons for the continuous rating. With the development of better insulating materials, iron of superior electrical characteristics, improved ventilation and design, it is possible to determine accurately the carrying capacity and safe temperature limits. It has also been found that deterioration of the insulation is not increased by operating at high temperature as long as certain safe limits are not exceeded and in many cases modern equipment will, under a given load, attain its maximum temperature in two hours or less, which was not true of the older types, and in order to give an overload guarantee on such apparatus, the capacity must be increased to that extent, thus increasing the initial cost. In the early days it was difficult to determine the power requirements of a particular drive and the overload guarantee was considered a safety factor, resulting in over, rather than under, motoring, thus increasing the first cost and reducing the efficiency and power factor.

Continuous Rating Favored

In a paper mill the load for many machines is variable, requiring the selection of motors for the maximum demand. With 40° rated equipment it was frequently possible to utilize the overload capacity at times of maximum demand whereas it is necessary to select continuous rated motors of higher capacity, as this type of equipment cannot be overloaded, and when this is done the chief advantage of the new rating, that of lower initial cost, is eliminated. On the other hand the power demanded by paper mill equipment under given conditions is well known and continuous rated motors can often be used thus effecting an appreciable saving. In comparing competitive proposals the temperature rise on which capacities are based must be taken into consideration to avoid unfair comparisons and possible trouble at some future date.

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220 Kv. Transmission

An interesting article has been prepared by Mr. R. J. C. Wood of the Southern Californian Edison Co., of Los Angeles, and which is to be presented at the Pacific Coast Convention of the A. I. E. E. at Vancouver, the second week in August, on the 220 kv. transmission system which is being installed for his company. The article points out that the highest present existing transmission is 165 kv., and that the increase to 220 kv. has been forced by the extremely rapid increase in the demand for power. As the amount of power that may be transmitted by a certain circuit varies with the the square of the voltage, it will thus be seen that the capacity at 220 kv. is practically four times the capacity at 165 kv. He concludes with the following summary:

Conclusions

Transmission at 220 kv. has been invested with a certain glamour, and the further investigation has been carried the more certain it appears that transmission at this voltage will only differ in degree from transmission at lower voltages, with which we are familiar. No new or startling effects appear probable.

The unequal voltage distribution over long insulator strings can be eliminated to the degree where individual units will be stressed less than they now are on lines in commercial operation. This is effected by shield rings which at the same time can be so designed as to keep any accidental arc well away from the insulators. Corona upon insulators and hardware is also prevented.

Standard suspension insulators can be used, so that 220 kv. transmission need not wait upon the design and trial of new types of insulator.

Transformers and switches are already developed, and have been built by more than one manufacturer.

The corona constants of large cables are known within rather narrow limits so that lines can be confidently designed to have definite known losses.

There are therefore no apparent obstacles in the way of 220 kv. transmission, the only requirement being that the amount of power to be transmitted shall be sufficiently large, and the distance great enough to warrent the cost of 220 kv. equipment. The increased carrying capacity of the transmission lines then more than offsets the equipment cost and 220 kv. transmission becomes more economical than at any lower voltage.

Efficiency in Incandescent Lamp Lighting

An Exposition of the Conditions Ordinarily Found, and Recommendations as to the Proper Method of Securing Maximum Efficiency

The report of the Lamp Committee of the C. E. A. at the recent convention of that Association, contained a quantity of useful data regarding incandescent lamps; many of the facts published have been little known to incandescent lamp users in general and in view of this the following article has been condensed from the Committee's report.

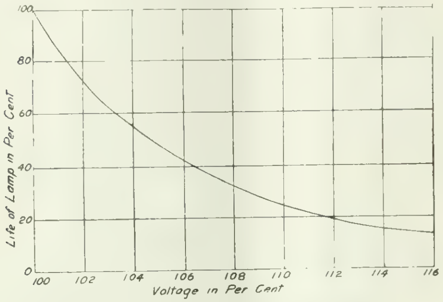

Fig. 1—Relation of Lamp Life and Voltage

Reduced Prices

After the introduction of the drawn-wire tungsten lamp, a reduction in price took place and prices have since gradually decreased, except for a period as a result of the war. It is satisfying to note that with the falling prices there have been also increases of efficiency.

Voltage Fluctuation and Lamp Life

The effect of voltage variation on tungsten lamps is very marked. A person unfamiliar with lamps might assume that if a lamp designed for certain voltage should burn a certain number of hours at over voltage, and the same number of hours at a corresponding under voltage, that one would compensate for the other, but such is not the case.

The relation between life and voltage is expressed in the following formula:—

$$\frac{L}{l} = \left(\frac{v}{V}\right)^{d} \quad \text{where :}$$

l—Life of lamp at rated voltage, v.
L—Life of lamp at any voltage, V.
d—is an exponent which for tungsten lamps is 13.8

As an example: if a 110-volt tungsten lamp is burned for 25 hours at 117 volts, and for 25 hours at 103 volts, there is a loss in the designed life of the lamp of 27.8%.

At 117 volts the life would be but 42.2%, thus

$$\frac{L\text{ (at 117)}}{l\text{ (at 110)}} = \left(\frac{110}{117}\right)^{13.8} = .422$$

of the life at 110 volts. Thus, the 25 hours of burning on 117 volts would be equivalent to $\frac{\quad}{.422}$ or 59.2 hours of burning at 110 volts. The percentage life for 103 volts is 251%, since

$$\frac{L\text{ (at 103)}}{l\text{ (at 110)}} = \left(\frac{110}{103}\right)^{13.8} = 2.51$$

The 25 hours at 103 volts is equivalent to $\frac{25}{2.51} = 10$ hours at 110 volts. During the two periods of 25 hours the resultant consumption of life of the lamp has been 59.2 plus 10.0 or 69 hours, a loss of 19 out of 69.2 or 27.8% in the life of the lamp.

Curve No. 1 given below shows the relation of lamp life and voltage. This refers to a condition where lamps are burned continuously at over voltage. As an example, if lamps are burned at 106% volts, the lamps will only give about 42% of the designed life.

An analysis of lamp consumption indicates that the 40 watt vacuum is apparently the most popular size, with the 25 and 60 watt sizes following closely.

Curve No. 2 gives the relation of candle power to voltage on tungsten filament lamps. The curve shows that with a comparatively small reduction in voltage there is a large decrease in the light output.

It is suggested that when lamps are ordered, they should be ordered according to the socket voltage found in service or very closely thereto. These curves show the importance of correct selection of lamps according to the socket voltage. It is suggested that a large amount of educational work could be done along these lines by the Central Stations and that consumers be advised by some method of the correct voltage of lamps to buy. A tag left attached to all disconnected services, stating that "the lamps to use on these premises are those of . . . . volts rating," is one method of doing this which has been adopted. In certain cases it has been found advantageous for consumers to install regulators for their lighting load. This is a good practice wherever there is a fluctuation in incoming voltage that will affect the light and life of the lamp to any extent.

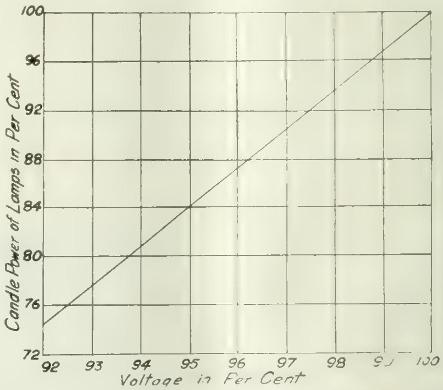

Fig. 2—Relation of Candlepower and Voltage

The Care of Lamps in Use

As a general rule, after the lamp has been put into the socket it is given no further attention until the lamp is burned out. Under ordinary conditions, if the lamp is not cleaned frequently, dust and dirt will accumulate to such an extent as to reduce the light given out by the lamp to a marked degree. As a matter of fact, if the lamps are not cleaned, the loss in light giving efficiency may be from 25 to 30% for offices and stores. In factories, needless to say, this figure may be much higher. A large public service concern offers

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Presented before the C.E.A. by the Lamp Committee to its customers a lighting equipment maintenance service, and they have found that by maintaining lighting equipment once every month, the illuminating efficiency can be raised from 25 to 40 per cent. Curve No. 3 shows graphically the effect of the accumulation of dust and dirt and consequent loss of light.

Use and Advantage of a Foot Candle Meter

To-day there are many instruments in general use to measure certain quantities, such as temperature, weight, pressure and so forth, by definite standards. There has long been a need for a simple, compact, portable instrument to measure the intensity of light on any given plane, for factory, store, street and power-house lighting. A foot candle meter meets this demand. As a result, the light intensities of rooms, offices, factories, etc., may be very easily determined by means of a foot candle meter. By very little experience a person may use the instrument accurately, the readings being direct in foot candles and no calculations being necessary.

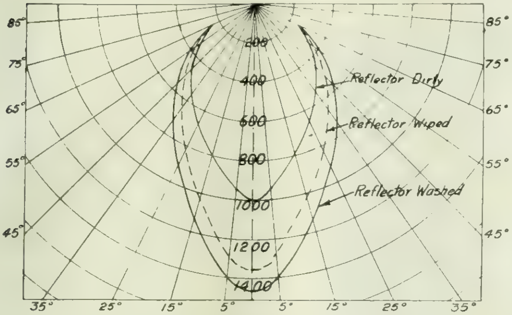


Fig. 3—Effect of Accumulation of Dust and Dirt

During the last few years engineers in illumination have carried on extensive investigations to determine the proper light intensity (foot candles) for various kinds of work. For certain kinds of fine work a desirable intensity of illumination varies from 10 to 50 foot candles, while for general rough work 4 to 8 foot candles is ample. Tables giving desirable light intensities are easily obtainable, and as a result, a factory manager is enabled to study his own illuminating conditions with the aid of a foot candle meter and tables showing the desired foot candles. This instrument certainly should be used wherever artificial lighting is applied. By the use of proper light intensity production may be increased and accidents reduced.

The foot candle meter measuring, 8″ x 6″ x 1½″, consists of a battery, voltmeter, rheostat, screen and standard lamp. The light from this standard illuminates the screen, one side of which is exposed to the external light source. The point on the scale that is receiving the same amount of light on both sides, appears to fade out, thus indicating directly the light intensity (foot candles).

Better Illumination

Manufacturers, store managers, and executives are appreciating the need for better illumination. In practically all places where the application of light is carefully studied there is a demand for illumination of high intensity.

In a large department store an increase in illumination of 6 to 10 foot candles increased the cost of lighting 1% and increased the sales from 6 to 7%. High intensity illumination in stores properly applied gives the customer ample opportunity to examine possible purchases carefully before buying, which naturally results in less returned goods and better satisfaction.

Faulty and insufficient lighting costs in the end far more than efficient illumination.

In the factory poor lighting reduces production and increases shrinkage—a loss of time and money.

With regard to general production in a plant, it is to be noted that an increase of four times the lighting intensity will equal a sum that is but a fractional percentage of the pay-roll, and the sum thus spent will be well repaid by measurable increase in production. More attention to illumination in only a matter of the possibilities of its service to industry being seen by responsible executives.

Lighting has power to stimulate and where adequately used there is little chance for error, accident, and idleness.

The experience of Cleveland among other cities is very interesting, as showing that crime is decreased by better illumination of the public thoroughfares.

Lamp Specifications

The Canadian Electrical Standards Association is working on the preparation of a set of standard specifications for Incandescent Electric Lamps.

The final report of the committee has not yet been completed.

New Developments

The most important of the improvements has been that of the so-called Mill Type lamp, a new style to be used for sign lighting as well as to meet the requirements of a lamp suitable to withstand a heavy vibration. For sign work the 25 and 50 watt Mill Type sign lamps have been developed in a blue bulb, which gives a whiter appearance to the light.

These lamps are made up in a P19 bulb, 4⅜″ over all, this size accommodates itself to the troughs now in general use. As the lamps are vacuum lamps the bulb does not reach as high a temperature as gas filled lamps, thus reducing the breakage due to rain and snow.

This ruggedness in lamp manufacture indicates the trend of the present lamp engineering practice.

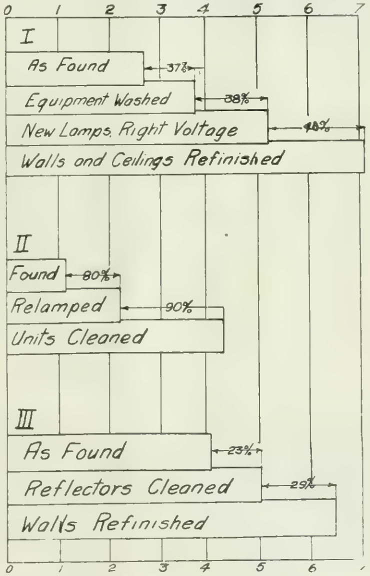


Fig. 4—Results Secured by Cleaning

Hydro-electric Development at Cameron Falls, Nipigon River, Ontario

The First Two Units of an Ultimate Capacity of Six Totaling 75,000 Horse Power, Installed. Head Gates and Power House Foundations Completed for Full Capacity

The Nipigon river is an admirable stream on which to develop power. The river drains an extensive area and has a large annual run-off, which, due chiefly to the large and effective storage in lake Nipigon, may be controlled so as to give an unusually uniform discharge throughout the year. Moreover, the condition of the banks is such that the total fall in the river, from lake Nipigon to lake Superior, of 250 feet, can be concentrated at three or four power sites.

The Cameron Falls plant is situated at the lower end of lake Jessie, an expansion of the Nipigon river, which, being a large still reservoir, freezes completely over in the early winter and by thus providing an ice cover until the spring break-up, prevents the formation of the troublesome frazil and anchor ice.

The present development with its 78-foot head and capacity of 75,000 horsepower is completed for two units of 12,500 horsepower each. These are now delivering power to Port Arthur. The head works and power house foundations are completed for the ultimate installation of six 12,500 horsepower machines.

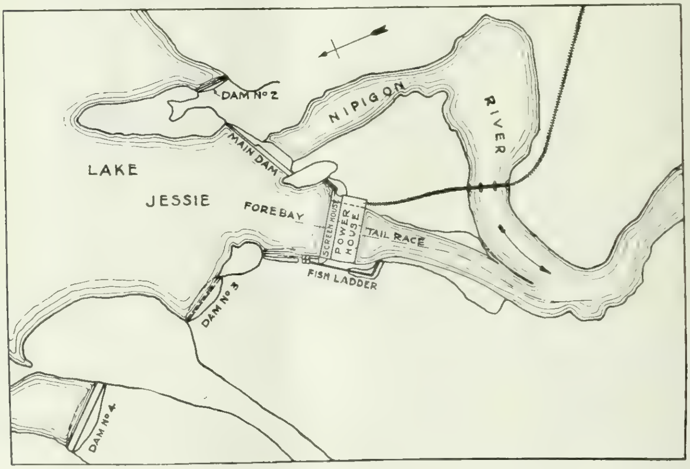
At Cameron Falls, nature has provided a convenient site where the power works may all be concentrated within a small area. In general, it may be explained that the power plant is formed by the construction of a dam across the Nipigon river at the lower end of lake Jessie and the excavation of short head-race and tail-race channels across the point of land formed by a bend in the river.

The Dam

The dam across the river is a solid, concrete, gravity-type structure, provided with eight spillway sections adjustable by means of stop logs for the regulation of the flow of the river. The stop logs in the sluiceways are raised or lowered by means of an electrically-operated winch which moves along an operating platform constituting a deck over the top of the spillways. The maximum height of the dam in the centre of the river is 67 feet.

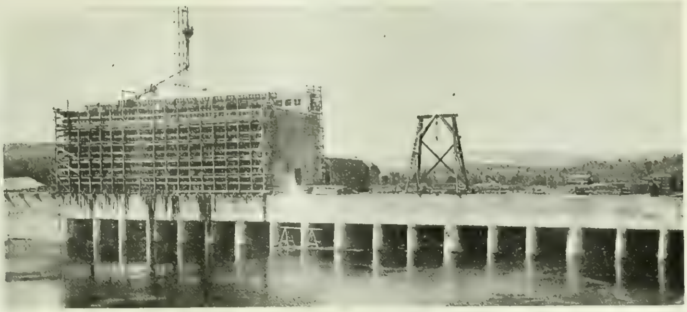
The Power House

The power house is of the concentrated type of construction in which the gate and screen house, the penstocks, and the transformer station all form part of the same structure. Although the superstructure for the gate house and power house has been completed for only the two units now installed, nevertheless the gate house and also the submerged part of the turbine foundations have been completed for the six units of which the plant will ultimately consist. The gate house is provided with electrically-operated steel gates and in order to prevent trash and ice flowing into the turbines, removable steel screens have been installed. The penstocks are formed in the concrete foundations and are so designed as to deliver the water to the turbines at low velocities, thus insuring a minimum loss. In constructing the scroll cases for the turbines a departure has been made from the usual practice of using cast iron by forming the cases in the concrete. This has proved more economical in construction and gives also more efficient operating characteristics.

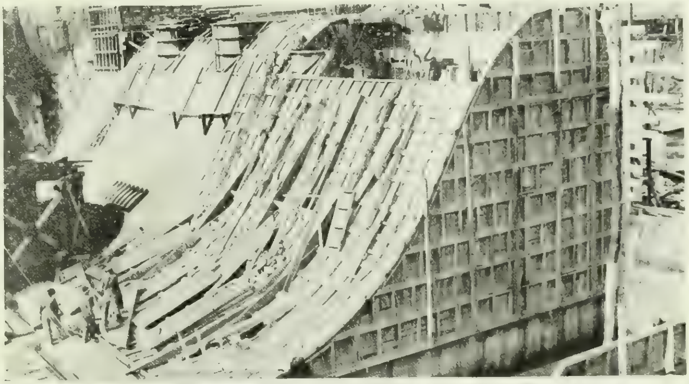


General plan of power development at Cameron Falls, Nipigon River, of which the first two 12,500 h.p. units, out of a total of 6, have just been installed by the Hydro-electric Power Commission of Ontario.

The turbines are of the Francis, single-runner, vertical type of 12,500 horsepower each, and operate at a speed of 120 revolutions per minute. They are controlled by the latest hydraulic-type governors, and in addition are provided with an emergency hand control for use in case of any failure in the governors. Each turbine is directly connected to a 10,600 kilovolt-ampere vertical generator which delivers power to the transformers at 12,000 volts. Each generator has its own exciter mounted directly on top of



Head works as they appeared on June 15, 1921.



Dam No. 1 as it appeared on September 19, 1921

General view of the main Dam Nov. 15, 1921

Dam No. 1 from down stream side on Dec., 1921 the main frame thus making each machine in itself a complete unit.

Travelling cranes are installed in both the gate house and the generating room; the former for use in operating the screens and the latter for effecting repairs to the main power units as well as for erection work.

The Fishway

Every year visitors from many parts of the world are found along the shores of the Nipigon river which is justly famous for its trout fishing. The Commission has given thought to the preservation of this sport. A fish-ladder has been provided around the west end of the power house. The design of the ladder has the endorsation of the Provincial Game & Fisheries department, and it is believed that the installation of this ladder has provided a free and satisfactory passage for the fish in their annual up-stream migration.

Electrical Equipment

Turning now from the hydraulic features of the plant to the electrical generating equipment, it may first be commented that in order to completely house the generating, transforming and station service equipment of the ultimate development, a superstructure having an overall length of 311 feet will be required; of this, 130 feet has been erected. The total width of the building from the north wall of the gate house to the south wall of the generating room is 150 feet. The height from the floor of the generating room to the roof of the high-tension room is 87 feet, and from the bottom of the tail-race 147.5 feet.

The superstructure has been built throughout of high-grade fire-proof materials, the framework being of steel, with walls, floors and structures for the electrical apparatus, of reinforced concrete. The ultimate development is for six generators with total capacity of 75,000 horsepower.

The generators, of which there are already two installed, are rated at 10,600 kv.a., 80 per cent. power-factor, 3-phase, 12,000 volts, 60 cycles. They are 26 feet in diameter. The rotors revolve at 120 revolutions per minute, corresponding to a peripheral speed at face of pole pieces of 7,917.5 feet or 1.5 miles per minute.

The weight of the total rotating part including the direct-connected exciter—which is connected to main shaft above the thrust bearing—the rotor complete, the turbine and the shaft, is approximately 125 tons, all of which is carried on a thrust bearing mounted on top of the upper bracket of the generator proper. This thrust bearing is 46½ inches in diameter and is designed to sustain a weight of 385,000 lbs. It is lubricated by mineral oil having a viscosity of 250 seconds at 100 degrees F. and is cooled by water circulating through a number of coils immersed in the oil.

The generators are air cooled, the air being drawn into the generating units through concrete ducts, either from the outside of building or from the generator room. The flow of outside air is controlled by dampers operated from the floor of the generator room. Each generator, when operating under normal load, requires 55,000 cubic feet of air per minute. The weight of the amount of air thus required in two hours and ten minutes would equal the weight (262.5 tons) of a complete generator.

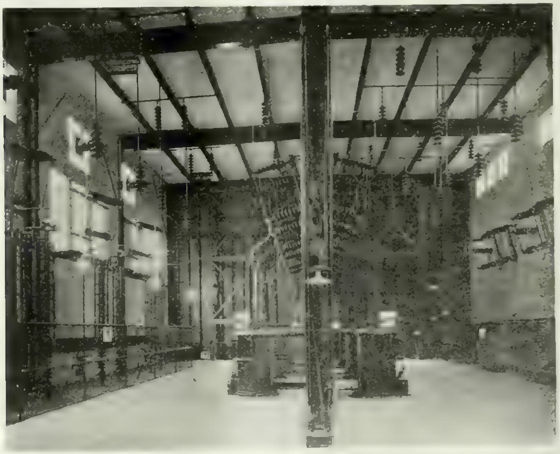
The station is equipped with a 75-ton electric travelling crane which is capable of handling the heaviest parts of the generator.

The electric power from the generators passes through 12,000 volt, oil circuit-breakers, to a duplicate bus, then to a bank of three, 8,000 kv.a., oil-insulated, water-cooled transformers where the voltage is stepped up to 110,000 volts. From these transformers, the power passes into the high-voltage room where it passes through the high-voltage oil circuit-breakers and buses, then out of the south side of the building where it is connected to the transmission line.

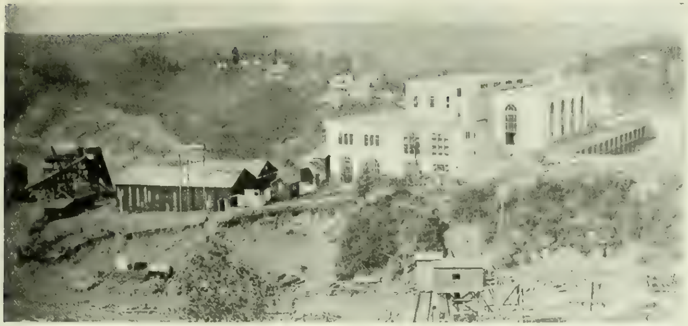
The power for the governor pumps, motor-generator sets, station lighting, elevator, etc., is taken from the 12,000 volt generator buses to a bank of three 250 kv.a. transformers where the voltage is stepped down from 12,000 to 575 volts. From these transformers this power is carried to a station service control-board whence it is distributed throughout the station. The control room is located at the east end of the station on the first floor of the control bay, and from this room the entire station will be controlled. Each section of the power house consists essentially of two generators, their bank of transformers and a transmission line. The switching equipment is such that any of the three sections of the power house may be separately operated or else operated in combination with either of the other sections.

A stair-way and an automatic electrically-operated elevator afford access to the seven floors.

In the basement are two 3,000-gallon, oil storage tanks, one for transformer oil and the other for switch oil. There are also two 2-inch centrifugal, 250 g.p.m. pumps for the water cooling system for the generator bearings and transformers. These pumps have a sufficient capacity for the water-cooling system of the ultimate development. In addi-

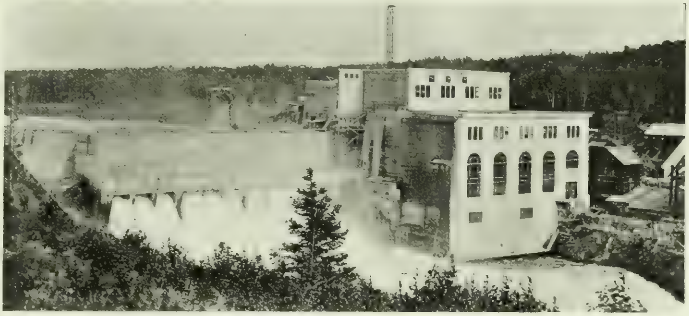


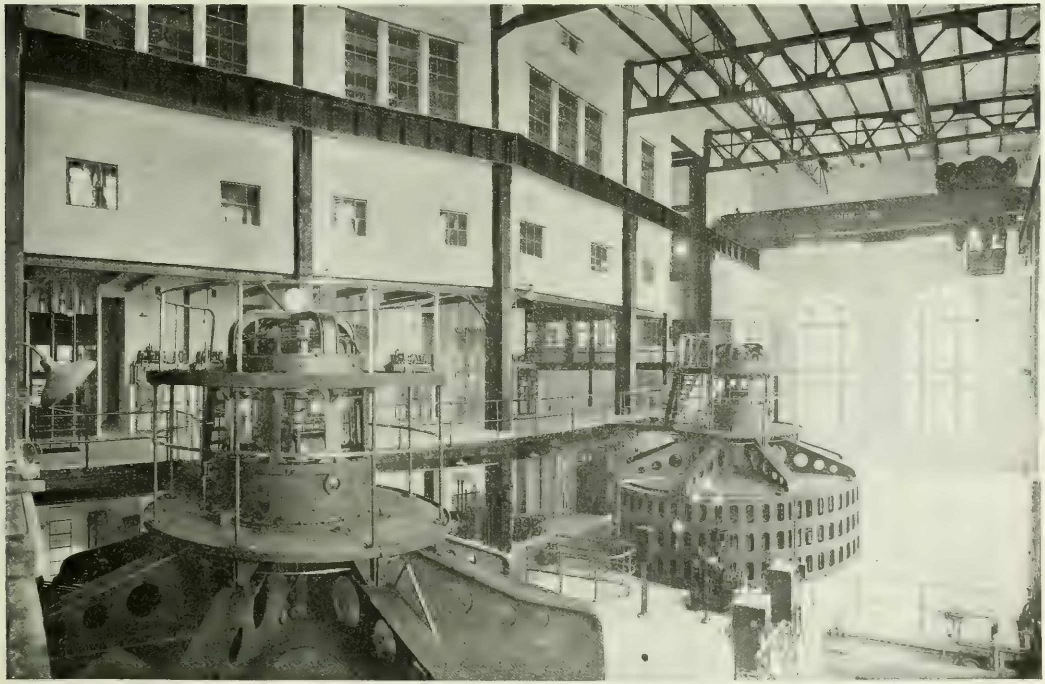
Interior view of Nipigon Power Station showing High Tension Switches and Arresters



General view of Dam and Power-house September 19, 1921.

General view of development as it appeared on September 26, 1921.





General view of interior of the Nipigon Power House, Cameron Falls, Oct., 19, 1921 tion there is one 2-inch centrifugal 50 g.p.m. pump for domestic water supply to the operators' cottages and one 3-inch centrifugal pump of 250 g.p.m. capacity against a 300-foot head for the fire protection of this station. Then there is the lubricating oil filter-tank which has a capacity of 3,667 Imperial gallons per hour. This is in series with the lubricating oil system for the generators and is capable of filtering oil from all the generators of the ultimate development. Alongside of this filter tank is an installation of two 2½ inch centrifugal, oil pumps of 75 g.p.m. These lift the oil from the filter tank up to the lubricating oil reservoir tank on the fourth floor. The oil from generator bearings feeds by gravity into the filter tank from which after being filtered it is pumped up into reservoir tank whence, by gravity, it is again fed to the generators.

Between the generator room and the transformer room is the 12,000 volt switch gallery with the 12,000 volt bus room and the high-voltage room above.

In the rear of the low-voltage gallery and extending the full length of the power house is the transformer room. At present there has been installed a bank of three 8,000 kv.a. transformers, also a compartment containing the three service transformers. To the rear of this building is the gate house.

On the west bank of the tail race, five houses have been erected for the operating staff, one of seven rooms and four of six rooms each. An additional house of eight rooms is yet to be erected. In addition there are three houses erected which were used for the construction staff but which will be retained for use of the operating staff.

Port Arthur Transformer Station

Eventually a permanent inter-city transformer station will be erected in a suitable situation, but in the meantime a temporary transformer station consisting of a building 67 feet long by 40 feet wide and 30 feet high, built of a wooden frame work with gunited cement walls has been built at Bare Point. On entering the building, the 110,000 volt power is carried through a high-voltage, oil circuit-breaker to a bank of three 4 000 kv.a. transformers where the voltage is stepped down from 110,000 to 22 000 volts at which potential power is delivered to the city of Port Arthur.

Progress of the Work

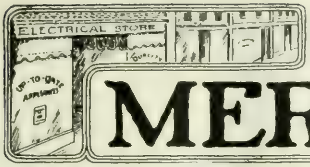
On the 1st of December, 1918, a small gang of men, by cutting and piling brush, commenced the work of clearing. On February 3rd, 1919, track was being laid from the Canadian National Railways' line to the camp site, on the 13th of March work was commenced on a temporary power house, and on June 6th, hand drilling and excavation commenced on the Cameron Falls power-house site. In the latter part of July, shovels were excavating the tail-race and the power-house site. On May 13th, 1920, the concrete footings were commenced for draft tubes Nos. 1 and 2. Portions of the physical equipment for the power-house reached the work in rapid succession. On the 31st of October, the 75 ton crane was ready for operation. On November 3rd the runner and shaft for No. 2 unit was placed in position, on November 5th the corresponding equipment for No. 1 unit was in position, and on December 13th at 8:55 p.m. No. 2 generator was ready for operating to be dried out. On the 16th of December, the transmission line to Port Arthur was phased out, found satisfactory, and at midnight on the 20th of December—just as the power contract was expiring—No. 2 generator was delivering Nipigon hydro-electric power to Port Arthur.

On January 9th, 1921, the final closure was made in the main coffer dam. On the 24th of the same month No. 1 generator was started, and on the 13th of March this generator was satisfactorily parallelled with No. 2. Diversion of water for power thus far was being made by means of the coffer dam with water at elevation producing a head of about 59 feet. On the 12th of April, 1921, drilling was started on the main dam site. On the 12th of August the first concrete was poured on this dam. On the 22nd of October all the auxiliary dams had been completed. On the 25th of November the water in the forebay was raised to elevation 732, on the 28th to 738 and on the 16th of December the stop logs were placed in the main dam in order to bring the water elevation to 745, giving a working head of 78 feet. On the last mentioned date the construction camp was closed and, with the exception of twelve men retained for construction plant repairs and for clearing out the camp, all the men were laid off.

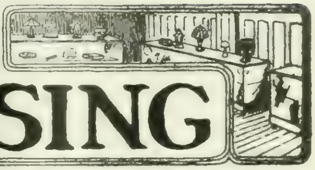
While work was proceeding on the plant at Cameron Falls, other construction crews were busy erecting the transmission line. The clearing of the right-of-way was performed in several sections, the first being commenced on the 19th of May, 1919, on the section extending from the intersection with the Canadian National Railways' line, to Bare Point at the easterly limits of Port Arthur. The work of the erection of the poles was first started on the section from Everart to Pearl on June 2nd, 1919, and the erection of the conductor on the same section on October 6th, 1920. The whole line was in operation on the 20th of December, 1920.

A view of the Nipigon Transmission Line

The main transmission line is 70.36 miles long, and has 1,124 wooden poles. It is designed for 110,000 volts with 4/0 B&S steel-reinforced aluminum conductor and C.P. 2133 O.B. 12464 insulators. The telephone wire is 3 x 13 galvanized steel, and the ground cable 9/32 inch galvanized steel. The line from Nipigon junction to Sprucewood junction and the Nipigon Fibre and Paper Co. is 110,000 volt wood pole construction, 6.67 miles long, with 111 poles. The sizes of conductor, telephone wire and ground cable are the same as in the main transmission line, the type of insulator being C.P. 2133.



BETTER MERCHANDISING



Some Suggestions from the West

By S. H. EXCELL,
Vernon City Superintendent

1. In my opinion many of the electrical appliances offered for sale suit only the well-to-do class. Prices and designs are too lavish to attract the average artisan or salaried worker who, after all, are in the majority in point of numbers. There must be an enormous waste in conducting some of these selling campaigns. Who pays the overhead but the ultimate consumer, who may be only a very small percentage of those actually canvassed?

2. Why stick to the thirty gallon water tank adopted by the plumbing trade? Let the electrical industry find out that the 12 gallon tank is ample for the average medium household. My motto is,—"Better 12 gallons of good hot water than 30 gallons only moderately warm."—Hot water can always be tempered down and there is no waste; while the installation costs and operating are kept more reasonable.

3. Encourage the time payment system on ranges. The average man is penalized by having to cash up or down to the tune of from $200.00 to $300.00 for a range installed. The average man's bill is paid as promptly as that of the well-to-do. The cash down system is a heavy penalty on plant operation, and plant factor.

4. The range and water heater manufacturers should co-operate in investigating, and advising the trade, just what is the most economical system for connections to their apparatus. Some plants are 3 wire, others 2, and connection cost is really part of appliance cost.

5. A cheap, but highly efficient street lighting unit, is much needed for small towns. The average goose-neck fixture is quite useless, where trees are on the streets; and the suspended type of fixture has been designed, and priced, for the larger cities, or does not suit in hilly districts.

What Determines The Consumer's Choice?

The Dealer is the Determining Factor in the Sale of Appliances—A Buyer's Market Exists at the Present Time and Appliances Have to be "Sold"—Hence the Necessity for "Selling" the Dealer

When the housewife is making up her mind to buy an electric washer or cleaner or other electric appliance, what or who, is the deciding factor in determining her choice?

There are three main influences: (1) Advertising in newspapers and popular magazines to reach the public; (2) The opinion and advice of friends and acquaintances and (3) The advice and backing of the electrical merchant.

The question every manufacturer and wholesaler wants answered is; which is the most important of these influences Which one dominates the other two? Let us investigate.

Consumer Advertising

No one doubts the value of a well set up advertisement in a popular magazine in creating an interest in any certain appliance. The reader looks it over and says to herself,—"That sounds fine, just what I want"—but she also adds mentally, if not audibly. "I wonder if the statements are all true. Advertisements do exaggerate matters so much at times. I know what I will do, I will ask my dealer about it."

The advertisement therefore, does not sell the appliance, it simply sends the customer to the dealer with the question —"What is your opinion about Blank's washing machine? I like the look of it. Would you advise me to get one."

The Influence of Friends

The influence of neighbors and friends, who have used the same appliance, is very considerable. This influence, however, is general rather than specific. It is difficult to say why, but while one woman may take the advice of another as to buying a washing machine, she follows her own inclination as to the type. It may be a feeling of independence or of jealousy. "Mrs. So and So's machine is all very well for her but I want something a little more complete, or Mrs. Brown's machine is too elaborate for common folks, and I think another will do just as good work for less money." Think out an explanation of this if you can but you will have to admit it is a fact.

The Dealer the Determining Factor

Now we come to the dealer. What is his influence in determining the choice the housewife makes? He says to the housewife: "We have made a careful study of the different machines—have seen them all. There are many good ones, and the one you mention would give you good satisfaction, but we have a machine here that we consider is superior in a number of ways. We like this and this and this. Here is a feature that protects you against bodily injury, and so on. We stand back of this machine, guarantee to keep it in working order, guarantee satisfaction or return your money."

Here we have the answer to the question—What is the determining factor in sale of an appliance? In 99 cases in 100 it is the dealer himself—the dealer who has first been "sold" on the merits of the machine he carries.

During the last few years manufacturers of practically every type of machine have spent large sums of money on "consumer" advertising. John Smith & Co., have advertised their washer as the best; James Brown & Co., have advertised their washer as the best, and so on. The result has not been satisfactory. It has befuddled the minds of the general public, who are entirely incapable of making a choice between the claims of the different manufacturers. If the same effort had been expended in "selling" the dealer on the merits of any particular machine, guaranteeing him such a profit that it would pay him to carry on a bigger sales campaign, the results would have been very much better.

If the manufacturers and jobbers feel called upon to go after the public direct then the form the publicity should take ought to be of an entirely general nature—the merits of washing machines in general, or ironing machines in general, of water heaters in general, and so on. We believe it is time for a right about face in the methods of publicity in the electrical industry. We firmly believe it is the dealer who needs backing to go out and get business, and that the thought that the consumer can either be pulled or shoved into a store to buy a certain make of appliance is not borne out by facts.

Speaking recently before the American Association of Advertising Agents Mr. Charles G. Phillips, President of the Dry Goods Economist Group of New York City has some interesting things to say: one of them runs as follows—"Good advertisers know today that the retail merchant in the dry goods field is the man that has the business in his hand. Dealer's influence is now made the universal basis of selling and advertising because it is the key note of the selling of merchandise in the dry goods and textile field.

The dry goods trade is as old as the world itself and surely the electrical industry cannot do better than profit by their experience. Mr. Phillips goes on—"The retail merchants' prime service is not the service of distribution—the filling of orders that people come in with. It is the service of selection. He is the most powerful influence in his community."

He illustrates this point. "A woman wants a new dress. On the club-house porch, or at the theatre, or in a magazine, she sees the kind of dress she wants. May be she decides it will be of silk. She determines on blue silk, and approaches her dealer.

'Something in a little stripe or a little figure. There now I like that very much. What is the price'.—The transaction is done.

She doesn't know and does not care who made the silk, She trusts her chosen merchant."

Mr. Phillips concluded his address in the following words —"I know a number of big advertising accounts which have been cut in half, but the business papers' appropriations were doubled because it is no longer a seller's market. We are in a buyer's market and sales effort is necessary. The fundamental purpose in advertising is to help sell merchandise. If ever there was need for the re-establishment of good, solid, honest contact between manufacturers and their distributing machinery, now is the time."

A buyer's market—that applies to the electrical industry in an intensfied degree. The public does not buy electrical appliances as it does groceries—from necessity; it does not buy them as it buys candy or confections—from desire or habit. Every electrical appliance has to be "sold" and the only individual who can sell it is the electrical dealer. Until and unless we develop our electrical dealer class, enthuse him with the merits of the equipment he handles, give him a good profit and stand back of him with an absolute guarantee of support, we can advertise to the ultimate consumer until all our money is gone and we shall still be marking time, and wondering why the electrical industry does not make headway.

The electrical merchant is at the same time our greatest need and our biggest problem. Do not let us split up our limited resources. Let us concentrate at the point that gives greatest promise of results.

The Radio-telephone Fire Hazard

Specifications Regarding the Installation of Receiving Sets From The Dominion Fire Commissioner

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Editor, Electrical News.

With thousands of radio sets now in use throughout Canada—the majority of them in private homes—and with the ranks of the "listeners in" swelling from week to week, all records for the popularity of scientific invention have been eclipsed. And like many other inventions, radiotelephony has introduced a new fire hazard. One of the fire dangers lies in the inclination of those interested to experiment with lighting circuits and other high voltage systems. Another is the hazard arising from lightning. To mitigate, as far as possible, these dangers, the specifications that follow were drawn up by a special committee including representative engineers. This committee places itself on record as considering stations making use of in-door antennae devoid of hazard. Emphasis is also placed upon the fact that most of the fires so far reported as originating with wireless sets, have arisen from lightning brought in from over-head antennae.

J. Grove Smith,
Dominion Fire Commissioner.

The following radio telephone safety rules, applying only to receiving stations, are extracts from a complete set of specifications that have been approved by the Dominion Fire Commissioner:—

Antennae

a. Antennae outside of buildings shall not cross over or under electric light or power wires of any circuit of more than six hundred volts, or railway trolley or feeder wires, nor shall they be so located that a failure of either antennae or of the above-mentioned electric light or power wires can result in a contact between the antennae and such electric light or power wires.

Antennae shall be constructed and installed in a strong and durable manner and shall be so located as to prevent accidental contact with light and power wires by sagging or swinging.

Splices and joints in the antennae span, unless made with approved clamps or splicing devices, shall be soldered.

Lead-In Wires

b. Lead-in wires shall be of copper, approved copper-clad steel or other approved metal which will not corrode excessively, and in no case shall they be smaller than No. 14 B. & S. gage, except that approved copper-clad steel not less than No. 17 B. & S. gage may be used.

Lead-in wires on the outside of buildings shall not come nearer than four (4) inches to electric light and power wires unless separated therefrom by a continuous and firmly fixed non-conductor that will maintain permanent separation. The non-conductor shall be in addition to any insulation on the wire.

Lead-in wires shall enter building through a non-combustible, non-absorptive insulating bushing.

Protective Device

c. Each lead-in wire shall be provided with an approved protective device properly connected and located (inside or outside the building) as near as practicable to the point where the wire enters the building. The protector shall not be placed in the immediate vicinity of easily ignitible stuff, or where exposed to inflammable gases, or dust, or flyings of combustible materials.

The protective device shall be an approved lightning arrester which will operate at a potential of five hundred (500) volts or less.

The use of an antennae grounding switch is desirable, but does not obviate the necessity for the approved protective device required in this section. The antennae grounding switch if installed shall, in its closed position form a shunt around the protective device.

Protective Ground Wire

d. The ground wire may be bare or insulated and shall be of copper or approved copper-clad steel. If of copper, the ground wire shall be not smaller than No. 14 B. & S. gage, and if of approved copper-clad steel it shall be not smaller than No. 17 B. & S. gage. The ground wire shall be run in as straight a line as possible to a good permanent ground. Preference shall be given to water piping. Gas piping shall not be used for grounding protective devices. Other permissible grounds are grounded steel frames of buildings or other grounded metallic work in the building and artificial grounds such as driven pipes, plates, cones, etc.

Wires Inside Buildings

e. Wires inside buildings shall be securely fastened in a workmanlike manner and shall not come nearer than two (2) inches to any electric light or power wire unless separated therefrom by some continuous and firmly fixed non-conductor making a permanent separation. This non-conductor shall be in addition to any regular insulation on the wire. Porcelain tubing or approved flexible tubing may be used for encasing wires to comply with this rule.

Receiving equipment Ground Wire

f. The ground conductor may be bare or insulated and shall be of copper-clad steel or other approved metal which will not corrode excessively under existing conditions, and in no case shall the ground wire be less than No. 14 B. & S. gage except that approved copper-clad not less than No. 17 B. & S. gage may be used.

The ground conductor may be run inside or outside of building. When receiving equipment ground wire is run in full compliance with rules for Protective Ground Wire in Section d., it may be used as the ground conductor for the protective device.

Radio Fees Change

The Dominion Government has made several revisions in the annual fees charged for the operating of broadcasting and receiving radio sets. The fees to be paid in respect to examinations for certificates of proficiency in radio telegraphy and radio telephony have also been revised.

The following is the revised list of fees:

Limited coast station, $50; public commercial station, $50; private commercial broadcasting station, $50; private commercial station, $10; experimental station, $5; amateur broadcasting station, $5; amateur experimental station, $1; private receiving station, $1; technical or training station, $5; ship station, $1.

Revised fees for examination are as follows:

Extra first-class certificate, $5; first-class, $2.50; second-class; $1; third-class, $1; experimental, $2.50; amateur, $.50; emergency (any class), $5; radio telephone certificate, $2.50.

A Wireless Chain 'Round the British Empire

In answer to questions in the British House of Commons, Rt. Hon. F. C. Kellaway, Postmaster-General, stated that the Government, in further considering the question of an Imperial wireless chain, has decided to erect in England a station of the ultimate power contemplated by the expert commission, instead of a station with smaller power, which was first proposed. The Government, he said, was advised that this station, with its greater power, would provide especially for direct commercial communication with India, South Africa and Australia.

The Imperial Government, Postmaster-General Kellaway, said, would erect a station of similar power in India, with Indian Government work. This station would be capable of directly communicating with England, South Africa and Australia. As a corollary of this decision, the proposed second station in Egypt and a station in East Africa would be deferred, and the question of the erection of a station at Singapore and another at Hong Kong would be reconsidered.

Canadian Government experts were expected to reach England very shortly, Mr. Kellaway said, in order to discuss the question of Canada's participation in the Imperial wireless chain scheme.

Radio Merchandising Situation

The summer slump has had a pronounced effect upon the radio business. Dealers are beginning to realize that they cannot afford to carry a large and heterogeneous lot of odds and ends of radio apparatus in the hope that they will be able to dispose of it. They are learning that overstocking of apparatus in an effort to meet the spasmodic demand of radio "faddists" is not going to prove profitable in the long run. They are beginning to realize that unknown apparatus that looks good in the catalogue, may become merely an ornament upon the shelves. New and more stable merchandising schemes are being evolved, as radio apparatus no longer sells itself, and the handling of this line must of necessity become more businesslike. It should be viewed as a legitmate line of electrical or household appliance, or a musical instrument, requiring the same keen merchandising sense as any other allied line.

There was a time when the phonograph business was a fad—when even automobile selling required pretty wild methods—and of course, the radio industry must pass through the same comparative stage. But the sooner we are out of it the better off we all will be.

Quality is no longer being sacrificed for speed. The slogan "send me anything, but send it quick" has now become "send me nothing if you can't sent it right."

Beyond doubt dealers are more careful in their buying. They are learning what to look for in crystal sets, what to avoid in telephone construction, which vacuum tube outfits may be depended upon and why, and so on. The caution which has been engendered as a result of the slack in consumer buying has made the dealer more conservative than ever in his purchasing. Whereas before, he was in the habit of ordering a couple of dozen sets of various makes, without troubling himself about how they were designed or put together, now he insists on opening and examining the apparatus before ordering.

Manufacturers are learning that dealers are looking for stability and reputation before they look for apparatus, and that they want some sort of guarantee that the manufacturer will be in business when the kicks, if any, come through. Radio is like the automobile business in one respect—if you buy a car and then cannot get separate parts in case of need, your car might just as well be relegated to the junk heap. If a consumer buys a radio outfit and then seeks separate parts to make a new circuit with or for additional installations, he will not be easily calmed if his dealer says, "Sorry we can't oblige you, but that manufacturer went out of business last week." The buyer feels that it was up to the dealer not to sell him stuff made by a manufacturer who goes in and out of business over night.

Radio Set for Saskatchewan Department of Telephones

The Saskatchewan Department of Telephones is having a set of aerials for wireless telephony constructed on the roof of the Parliament Buildings. The installation is well under way and will be in operation in a short time. The department, it was stated, is installing the system as an experimental measure, with the intention of keeping in practical touch with developments of this up-to-date method of telephonic communication, and it is understood that the use of the installation will, for the present at any rate, be confined to departmental purposes.

Fred E. Garrett, Western Representative

A recent test conducted by shipping board representatives at a western port, to determine the most efficient and economical method of handling communication between points gave the honors to radio. The traffic costs were between 40 and 50 per cent. less using radio communication. The result is that most of the coastwise traffic is now being given to the radio circuit.

Exhibit of the Lincoln Meter Company

Through an oversight, mention of the exhibit of the Lincoln Meter Company at the recent convention of the A. M. E. U., was omitted from our issue of July 15. Their display included graphic measuring instruments—one measuring volt-amperes and one measuring watts—indicating demand instruments and split-core transformers.

Radio Tower at Prince Rupert

Mr M. J. McNeill, Prince Rupert, B. C., owner of the Central Hotel, is erecting a combined radio and observation tower, valued at $2,600, for the use of hotel guests.

Dominion Convention of Contractors and Dealers

A Dominion Convention of Electrical Contractors and Dealers will be held in Toronto on November 13th and 14th.

Messrsc Nelson & Hawkins, late of the staff of Beattie—McIntyre Ltd., have opened an office at 99 Adelaide W. Toronto. They will carry on a general electrical lighting & power installation business, wiring and repairs.

The Ontario Gazette announces the incorporation of the Wentworth Radio Supply Company, Limited, for the purpose of manufacturing, buying and selling radio equipment, etc. Capitalization $100,000. Head office, Hamilton.

The Canada Gazette announces the incorporation of The Dubilier Condenser & Radio Corporation of Canada, Limited, for the purpose of manufacturing and generally dealing in all kinds of radio apparatus, etc. Capitalization $50,000. Head office, Ottawa.

The electrical industry will hear with regret of the death of C. F. McGilvray, chairman of the Board of Directors of the Robbins & Myers Company of Springfield, Ohio.

Electrical Wiring of Mount Royal Hotel

A Contract Calling for the Installation of an 18 Panel Switchboard, Several Different Forms of Signal System and Necessitating Thorough Previous Organization

Two cuts on Page 58 of this issue show two stages in the electrical wiring for the Mount Royal Hotel, now under construction at Montreal. The first, shows the method of placing electrical conduit on the forms prior to the pouring of the floor slab. It illustrates the position an electrical contractor must be prepared to assume and maintain, during the construction of a building of this type.

Immediately upon the completion of the wood forms and the placing of reinforcing steel, the electrical contractor takes possession and his organization must be in condition to keep ahead of the concrete men. On this particular contract the electrical contractors were allowed very little time and on some floors it was necessary to place over 30,000 ft. of ½ inch conduit in a week.

All conduit up to and including 1 inch is bent as near as possible to the location at which it is used. All bends were made to the radius prescribed by the Underwriters' Code by means of a standard pipe bender. This assures a standard bend for all conduit and avoids kinks and damage. Offsets and saddles were made by hickeys. All outlet boxes are kept in position by iron braces which, before pouring, were nailed to the forms.. After the conduit has been installed all openings are plugged to avoid entrance of concrete, water or other foreign matter.

As all switches and outlets for lights, telephones, telegraph, telautograph, fire alarm systems, etc., must be in the exact location, the electrical contractor must have a mental picure of the interior of the building as it will appear when completed, in addition to a complete knowledge of plans. This is necessary to avoid changes which might be necessitated after the concrete sets and the forms are removed.

The second cut, on Page 58 shows the conduit and outlet boxes in place, after the pouring of the floor slab and the removing of the forms. The floor is now ready for partitions and the necessity of having outlets in proper position is clearly indicated. The expense of making changes at this stage of the work is obvious.

Partitions and door bucks will now be placedd and it is at this phase of the work that the electrical contractor discovers discrepancies if any, in location of outlets. At this time care taken in proper organization is amply justified.

On the Mount Royal Hotel contract, in order to avoid discrepancies, the electrical contractor prepared what is generally known as a buck plan. On information received from the general contractors, this buck plan showed the exact location of the centres of rooms, bedroom partitions, bathroom partitions and door bucks.

Axis lines were struck down the centre of the building and corridors. The location of every outlet was determined not only from measurements from axis line to the outside steel but was also located by measurements running from the outside steel back to the different axis lines. This system was carried out in all directions and as the figures were given in both directions on the buck plan, considerable saving of time installing the work was permitted. It afforded a very carefull check on all locations in addition to minimizing incorrect positions. When the fact is considered that two receptacles and two switch boxes were placed back to back in the 3 inch partition, the value of this procedure can be readily seen. All dimensions on the buck plan were made additional; that is, if the first room partition was 12 feet 6 inches from the centre of steel and the second room 14 feet, instead of showing 12 feet 6 inches and 14 feet respectively, the first dimension was shown 12 feet 6 inches and the next dimension 26 feet 6 inches.

The entire electrical installation is being performed by the Canadian Comstock Company, Limited, of Montreal and Toronto.

The Electrical Contract

The complete electrical work, consists of the installation of an 18-panel main lighting and power switchboard in the basement, a sub-panel switchboard in the pent house and 8 power distributing panels in different parts of the building, together with conduit and wiring systems for power, lighting, fire alarm, carriage calls, time-clocks, time-stamps, telautograph, telephone, telegraph, watchman's system and miscellaneous low tension apparatus.

The current for power, which is 230 volts d.c., will be generated in the basement by 2200 volt synchronous motor-generators, and a steam driven generator to be used in case of emergency. The lighting will be 230-115 volts and in general a.c. but the system will also be arranged to be operated from the d.c. bus bars.

Each bedroom will have a ceiling light for general illumination, controlled by a local switch at the entrance to the room, three base plugs for local lighting and one telephone plug. Each bathroom will have a bracket light over the washbasin and cabinet, controlled by a local switch at the bathroom door, and a heater plug for heating appliances at the side of the washbasin.

The lighting in the main lobby, palm room, main diningroom, and ball and banquet rooms will be controlled by push buttons operating remote control.

A Correction

Through a shipping error, the wrong plate for the A B C washing machine advertisement reached us and appeared in our July 15th issue. The error was discovered just after we had gone to press—too late to correct it. As a result, you will have noticed in this advertisement (which was entitled "A Three Hundred Thousand Dollar Trainload of A B C Electric Washers") the fact that the United States prices were quoted and that the addresses of the Canadian distributors for Altorfer Bros. Company were omitted. In this issue, on page 9, the advertisement is printed as it should have appeared in the July 15th issue.

General Electric Acquires Canadian Edison Company

Effective August 1st next, the Canadian General Electric Company, Limited, will acquire all the interest in the Canadian Edison Appliance Company, Limited, of Stratford, and the latter company ceases to exist as a separate corporation. Mr. R. S. Morgan, secretary-treasurer of the Canadian Edison Company, made the above announcement recently.

The controlling interest in the Canadian Edison has been held by the Canadian General Electric Company since its inception, the present change merely being that the shares held by the Edison Electric Company, of Chicago, have now been acquired, and the plant becomes an entirely Canadian concern.

Central Station Merchandising

A Central Station Appliance Department Acts as a Goodwill Builder Between the Branches of the Industry[*]

Recognizing the merits of previous reports on buying and selling of electric merchandise stock accounting shop management and operation and kindred subjects which now make excellent reference manuals, the merchandise sales bureau has this year centered its efforts on broader subjects of vital interest to all engaged in the appliance industry. During the past two or three years there has been conflict of ideas on merchandise policies and on the mediums of distribution for electric merchandise. There has been much discussion of whether the central station should stay in the electric merchandising business.

We sense a growing tendency toward the belief that central station companies are the logical ones to sell and promote the use of electrical devices. Outside of the question of the value of electrical devices as load builders and goodwill builders for public service electric companies, it is generally conceded that the capital necessary to carry on the work on a proper scale, the standing of the central station in the community, and the natural inclination of the public to expect all part of the electric service to be guided by the central station company, make central station leadership in electric merchandising, or at least electric merchandising promotion, a particular function.

In presenting our report we assume this point of view and are inclined to believe that in communities where central stations carry on an electric merchandise business on principles of fair competition with other electric dealers, that a healthier business condition for the other dealers results, and the per capita use of electric devices is greater than where that policy does not exist.

The work of the bureau was divided into five divisions: central station merchandising service, electric cooking and heating, relation with manufacturers, standardizing and testing, and sales promotion.

Central Station Merchandising Service

Assuming that central station leadership in the selling or promotion of electric devices is of paramount importance, a Division on Central Station Merchandising was formed.

This division has promoted the idea of having extensive tests made by central station companies of the association to ascertain the value of appliances as load builders and income producers. Results so far obtained by a score of companies indicate that a substantial percentage of residential income is derived through the use of household devices and that sales activity, or promotion to place them in the hands of service customers, is most important. The action of companies along these lines is further justified by the goodwill building value, giving closer contact with the customer and broadening the meaning of electric service. The lighting bill as such is giving way to the electric service account.

The purely selfish motive which would promote appliance distribution on a non-competitive basis has now gone into the discard, and we find merchandising profit as a goal gaining rapidly in favor of the leading companies. We find that a central station appliance department operated as a profitable merchandise business has gained favor as a goodwill builder between the branches of our industry and is productive of healthier retail distribution.

We maintain therefore:

1. That central station leadership is a benefit to the company, to the trade, and to the public.

2. That the needs of the public demand intelligent advice from the public service company on various types and qualities of electric products.

Relation With Manufacturers

The value of any electric device lies in the service it gives. It may or may not be adequate for the work it is supposed to accomplish. If it does not give service, the customer places direct blame on the dealer rather than on the manufacturer. Maintaining the device in service is both a manufacturer and a dealer problem.

Selling the idea of a particular electric service given through an electric device, sales methods in getting devices to the cusomers, and advertising in connection with them, are all problems of the dealer and manufacturer or his agents, the jobber.

They are common problems for dealers and manufacturer and they should be in closer co-operation. To this end we had this year a committee of manufacturers as a part of the executive committee of the bureau. We have not functioned effectively nor produced definite results. The seed has been planted, however, and we feel that it will bear fruitful results at a later date.

The question of discounts, one of the most complex with which we have to deal, has been under discussion. A wider spread for the dealer to cover his large handling charges is essential, especially in demonstrated articles such as washing machines, ironers, vacuum cleaners, etc. We believe that there is merit in the fundamental idea that quantity purchase should be the basis of discount. We realize, however, that discussion of the question is not relevant here, and that the entire subject with its ramifications is one for careful study.

At this time the bureau wishes to commend the Vacuum Cleaner Association for its broad, progressive action, and its effort to sell a great electric idea to the public through local newspapers of the country.

Standardizing and Testing

It seemed desirable to continue this year effort toward producing durability in devices, and to encourage and promote the testing of appliances at some central source.

The committee having this work in charge has met with handicaps but tests are still being conducted through the Electrical Testing Laboratories. For the first time an informative exhibit covering this work is a part of the general convention exhibit.

The standardizing of cords and plugs has progressed, a marked feature being the adoption of the standard split socket plug by some of the larger portable lamp manufacturers. Much remains to be done in connection with the checking of durability of cords. The problem is complicated by the wide range of treatment a cord receives in actual service by the individual user. Plans are now being devised to continue practical tests on the basis of home service requirements.

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[*] Report of the N.E.L.A. Merchandise Sales Bureau

Progress must necessarily be slow but we are heading in the right direction. The value of an appliance is in the service it gives the owner, the efficiency of that service and durability under service.

We maintain that superior quality will ultimately be the goal of all manufacturers of electric devices, both by reason of the demand of the public and by reason of necessity of maintaining guarantees.

There will be a market for goods of lower grades, but value for value should be obtained, and misrepresentation by any manufacturer will not only react in general disapproval of the consumer market for electric service through these devices, but will likewise react in the automatic elimination of the manufacturers who misrepresent.

All central stations in the country should be informed on the merits of the devices which they sell or promote and stand as a protection to their customers for the reason that they must protect their electric service.

Electric Cooking and Heating

It seems that this subject is ever new. The electric range for domestic use is showing marked development; the industrial cooking message is spreading; commercial cooking devices, bake ovens, etc., are making sure progress and together they open up a field for rich returns. We can be most optimistic.

The essentials for building a cooking load are (1) a rate that will better the business, (2) an engineering department familiar with the characteristics of a range load, and (3) an organization sold on the merits of electric cooking.

Certain fundamental handicaps exist in large communities to the building of an electric cooking load, but these we believe will be eliminated at the opportune time. Because such handicaps do exist need be no disparagement to the central stations who are ready. To them the report of the division this year is addressed. Electric cooking is here to stay. The sales promotion methods representing the experience of central stations that have successfully sold electric ranges are represented herewith. The essential of selling the company organization is carefully considered and methods recommended for its accomplishment.

In connection with the servicing of ranges it is interesting to note that one large company that has developed a considerable range load has over a period of years reduced its average cost per service substantially, the reduction coming about notwithstanding the rise in cost materials. Can there be more convincing indication of the point of view that must be taken in building a range load? Service supply costs must be reasoned over a period of years rather than on cost during early development.

The report of the division brings out evidences of the off peak nature of the range load. This is most important in justification of a rate and in the matter of station capacity. Information on the varying diversity factors in range loads is most important in the discussion of service supply, and we find that because of the widely diversified habits of home life and in cooking that diversity of factors of ten to one and even fifteen to one are not uncommon.

It is of further interest to note that a study of transformer loads brings out that the electric range customer is always a very much higher electrified customer in every way than one not sold on the electric cooking idea.

Our report in connection with the subject of electric cooking and heating would not be complete without impressing the thought of the value of extending the promotion of cooking into companies that have a fair start in the domestic field are already at work. Every hotel, restaurant, hospital and like institution and all bakeries offer opportunity for heavy duty equipment, at least bake ovens. The load is highly desirable. The income is sure and the service given will be appreciated.

Recommendations are offered by the division in connection with electric cooking development which affect all branches of the industry.

Sales Promotion Division

The sales promotion division was formed to study sales organization and sales methods for the distribution of electric merchandise. Also to devise plans for selling the electric idea and increasing thereby the retail market for various groups of devices. The work included the advantages for co-operation between manufacturers and dealers, central stations and contractors. The deliberations of the division were in progress when the great broad business development movement started in our association which included the purposes of our sales promotion plans in broader scope. Instead of duplicating effort it seemed better to assist and no report of the division is submitted. For sales promotion recommendations we are pleased to make reference in this bureau report to the synopsis of the joint committee on business development—appliance section.

Recommendations

The bureau would go on record with the following recommendations to central stations:—

1. That the merchandise department be operated on strictly cost principles.

2. That friendly contact with progressive dealers and contractors in periodic sales and promotion work be a part of the operating program of the merchandise department wherever desirable.

3. That all central station companies that have not made tests for ascertaining appliance load, check up with the findings of other countries either to disprove or to be convinced of the income producing value of electrical devices.

To the manufacturers we recommend:—

1. That quality and durability be kept an essential in the building of devices and that the problem be studied for giving better and prompter service at lowest cost.

2. That the manufacturer make careful study of the advantages of national advertising versus local advertising and sales effort, and the desirability of local co-operative newspaper advertising with the dealers.

3. That the cooking schools of the country, public and private, and institutions of learning offering domestic science courses be given careful attention by the manufacturers as an advertising medium. We feel that they are not generally sold on the electric housekeeping idea, and yet they are not only turning out the future housekeepers of the country, but the students are practicing their school knowledge in the home. They are not taking with them the electric cooking message.

To the contractors and all other dealers we recommend that earnest effort be made to keep repair costs as low as possible and help create confidence in electrical devices.

We suggest to the merchandise sales bureau for the coming year that as it has the commercial and industrial field as a part of its organization a committee of manufacturers consisting of a representative or representatives of the washing machine association, vacuum cleaner association, heating device manufacturers, etc., to meet with the executive committee as often as expedient for the discussion of mutual problems.

The bureau this year for the first time has a booth in the convention exhibition and we believe that the information shown in the charts, graphs, and tabulations exhibited have informative value for all those interested in electric merchandising. Our chief purpose is to bring out the load building and income producing feature of domestic and industrial devices.

Attention is likewise called to the exhibit of the Electrical Testing Laboratories representing a part of the work of the division on standardizing and testing of our bureau, and showing the nature of the tests being made to establish durability and efficiency of certain types of devices on the market. This is likewise an innovation.

Conclusion

The various phases of electric merchandising have been well covered by discussion and reports. Each year brings new problems and this year is no exception. The transition period has brought knotty problems in electric merchandising for the manufacturer and jobber and central station, and as we view the appliance situation today, we see problems needing particular attention. We refer to the coming of cheap devices from foreign markets; the impossibility of some of our manufacturers to ride the gale of over production, depleted finances and the result on our market; the uncertainty of substantial retail outlets; the ever present differential problems, and the present weakness of the buying market.

The last is now to receive the heroic treatment it needs. The buying pendulum swung high and in its backward sweep seemed to leave its arc and come to a dead stop. It will soon be put in normal swing and in our opinion, the work of the merchandise sales bureau for the coming year should be to aid in every way possible business development work. Business normal once again will go far in solving the serious problems of today.

Signal Sales Managers' Convention

The first annual sales managers' convention of the Signal Electric Manufacturing Co., manufacturers of a complete line of high grade radio appliances as well as bells, medical batteries, etc., was held in Menominee, Michigan from June 26th to 29th inclusive. It was a 100% convention in view of the fact that everyone of the District sales managers in the United States and Canada were present. It was in every sense also a business convention, as from six to nine hours each day were devoted to the discussion of the problems relating to the production of appliances so as to meet the ever-changing and growing demands of the market. While the problems affecting the various sections of the country were in many cases of a local character, the co-operative spirit in which the meetings were conducted by the general manager, Charles E. Hammond, resulted in highly constructive results. The delegation made a careful inspection of the plant which was established and built in the year 1905, but is to-day one of the best equipped plants in the country. Modern automatic machines were shown to the delegates and they were greatly surprised at the additions to the plant which have been planned, some of which are now being constructed. It was concluded at the sessions to greatly enlarge the Signal line and make it one of the most complete high class lines of radio on the market. Among the managers was Mr. A. Ross Osborne of R. E. T. Pringle Ltd.

An Organization Program for Western Canada

Representatives of the Society for Electrical Development, and of the National Association of Electrical Contractors and Dealers in the persons of Kenneth A. MacIntyre for the Society, and Laurence W. Davis for the Association, have arranged for a tour of Western Canada and the United States. Their first six meetings will be held in Canada as follows: Fort William, July 31st.; Winnipeg, August 1st.; Regina, August 3rd.; Calgary, August 8th.; Vancouver, August 14th.; Victoria, August 16th.

Mr. Stephenson to Vancouver

Harry C. Stephenson, of Cochrane Stephenson & Co. Ltd., Winnipeg, left for Vanvouver on the 4th July, where his firm intend to open an office, which will be under his management. Mr. Stephenson was accompanied by E. G. Hohs, assistant general salesmanager of W. H. Banfield and Sons, and it is their intention to call on the trade between Winnipeg and Vancouver. Mr. Cochrane will remain in Winnipeg and look after Manitoba and Saskatchewan territory, while the Vancouver office will take care of Alberta and B. C. Announcement of the Vancouver address will be made in the near future.

Mr. Harry C. Stephenson

Convention Committee of O. A. E. C. D.

The initial meeting of the Convention Committee which has in charge the November convention of the Ontario Association of Electrical Contractors and Dealers met on Monday July 17th, and appointed chairmen of sub-committees. The following chairmen were appointed: finance—C. S. Barthe; publicity—H. H. Rimmer; papers—Frank T. Groome; entertainment—Bert Balch; reception—George Cross; hotel arrangement—C. H. Hopper; registration— E. A. Drury, and badges—H. R. Johns.

Convention Headquarters will be at the King Edward Hotel, Toronto; the dates November 13th, and 14th.

J. H. Schumacher, secretary and manager of Schumacher Gray Co. Ltd., Winnipeg, was marrien to Miss Una Cox, at Augustine Church, Winnipeg, on June 3rd, the honeymoon is being spent at Minneapolis and St. Paul. Hearty congratulations "Schue."

W. G. Hazel, salesmanager of Robbins & Myers Co., of Brantford, was a recent visitor to Winnipeg, in the interests of his firm. He left Winnipeg for Calgary.

A Dominion Convention of Electrical Contractors and Dealers will be held in Toronto on November 13th and 14th.

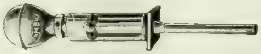
Schweitzer & Conrad Inc., 4435 Ravenswood Ave., Chicago, is distributing an interesting little folder entitled "S & C Lightning Arrester Performance."

Mr. Frank B. Chapman has been appointed Eastern Sales Manager of The Bryant Electric Company succeeding Mr. George V. W. Ingham, who has resigned. He will make his headquarters at the factory in Bridgeport.

The Latest Developments in Electrical Equipment

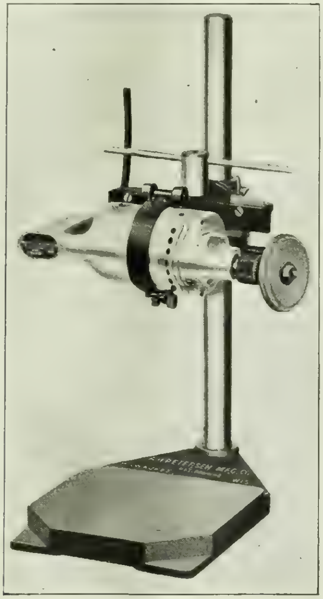
Novel Battery Tester

Car owners and radio fans would appear to be the consumers of a new battery tester being placed on the market by the American Bureau of Engineering, Inc., 2632 Prairie Ave., Chicago. The device is a hydrometer, and it is claimed that it can be read in semi-darkness; it is about six inches long and consists of a bulb, a filling nozzle of rubber, and a glass tube. Inside the tube are three colored balls, made of materials whose specific gravities differ; if the white ball sinks, the charge is still right, if the green, the charge is not full, and if the red, the charge is dead. It is claimed that the user need not know anything about battery gravities to use this tester.



"Hole Shooter" Drill and Attachments

The idea that an electric drill could be used for other purposes in addition to the drilling of holes has been carried out by the A. H. Petersen Manufacturing Company, Milwaukee, Wis., with the introduction of a portable drill with attachments. Among these are a radial portable drill-press stand, a battery terminal opener, wire brushes, a commutator saw-wheel, grinding wheels and buffers.



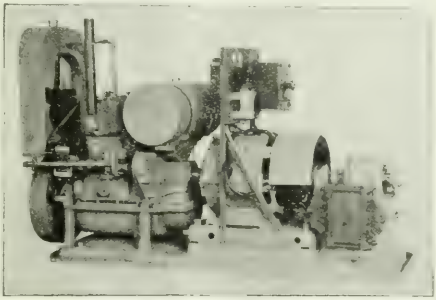
It is claimed that the stand will hold the drill rigidly at any angle, vertically or horizontally. When used in the vertical position, the combination serves as a drill press and in the horizontal position as a grinder, buffer or polisher. The complete drill-press stand weighs 30 lbs. and with the hole shooter included, 34 lbs.

The attachment used as a battey terminal opener is a lead cutting drill bit which cuts a hole 13/16 in. in diameter. Brush attachments furnished are suitable for such jobs as cleaning carbon from cylinder heads, burning metal parts, cleaning castings, sanding wood surfaces, etc.

The machine will drill up to ¼ in. in metal and 5/16 in. in wood.

Engine Driven Welding Equipment

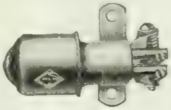
In our July 15 issue a description was given of an engine driven welding equipment for use when electric power for motor drive is not available. The apparatus was described as being equipped with a Doman four cycle two cylinder engine. The illustration herewith indicates the general arrangement as developed by the Westinghouse Company.



Pilot Lamp

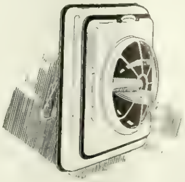
The introduction of stop signals has demontrated that there is a need for some sort of tell-tale lamp, situated in view of the driver, to determine at all times whether the rear signal is burning.

The Culver-Stearns Manufacturing Company, Worcester, Mass., have introduced a uilot lamp to meet this need. This lamp is placed in series with the company's signal lamps and thus indicates to the driver whether his tail lamp is operating. It is attached to the under edge of the dash and is thus always visible to the driver. The lamp is furnished with either a red or green jewel, and is made of brass with a nickel plated finish. Wiring diagrams are furnished, showing the method of attaching and connecting. It is claimed by the manufacturers that the lamp may be used in series with all types of rear signal lamps.



Wall or Floor Heater

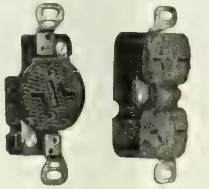
A new heater manufactured by the Reznor Manufacturing Company, Mercer, Pa., is so constructed that it may be hung on the wall out of the way; this is accomplished by the elimination of the pedestal. This design embraces a device on the back for hanging to a wall and six wall nails are furnished with each heater; a folding easel is provided for standing on the floor. The heater is 17½ inches long, 16½ wide, 6½ inches deep, and weighs 14 lbs. Voltage 110,



amperes 6, watts 660; for either alternating or direct current. Each heater is fitted with a 10 ampere toggle switch. Several finishes may be obtained, including white enamel, nickel, Japenese bronze, Butler silver and burnished brass.

Single and Double Flush Receptacles

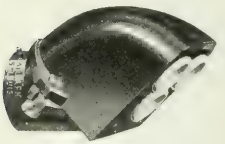
Single and double, composition, flush receptacles have been recently added to their line by the Gaynor Manufacturing Company, of Bridgeport, Conn. A point claimed for there receptacles is that they are very shallow, measuring



1 in. in depth, and allowing additional room in the metal box for making connections. Good connection is assured by the phospor-bronze contact springs which engage both sides of the attachment plug prongs. The bodies of the receptacles are made of black composition. No sealing compounds are used and the surface has a matted finish.

Conduit Entrance Fitting

The Killark Electric Manufacturing Company, 3940-48 Eastern Avenue, St. Louis, Mo., are now manufacturing an entrance fitting for 2½ in. and 3 in. conduit. The finish is either black japanned or galvanized and covers, hubs and



plates are of cast iron. When the fitting is installed, it is prevented from turning on the conduit by a set screw on the hub. The manufacturers point out that the fitting may be used on either a horizontal or a vertical pipe by changing the relative positions of the hub and cover, as shown by the illustration.

A Duplex Table Outlet

The Arrow Electric Company of Hartford, Connecticut, have recently placed on the market a device which provides two outlets for appliances—on the dining room table, office desk or wherever wanted. The outlet is nickel finished, has six feet of silk cord and a convenience plug for attaching to the source of current. The company furnishes a display

carton which shows the outlet in use on a breakfast table, attachment being made to a percolator and toaster.

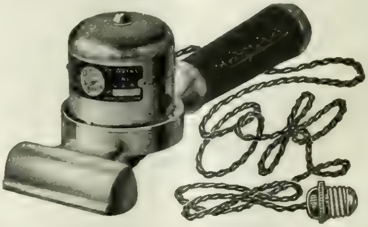
Three Heat Electric Solder Pot

An electric solder pot that makes possible an increase in shop efficiency has been perfected by the Westinghouse company. This "Three Heat Electric Solder Pot," as the product is called, changes an immovable fixture into a portable appliance. With a gas heated pot, it is frequently necessary to carry molten metal in a ladle, but this is eliminated by the use of the electric solder pot, which can be moved from place to place and can be attached for use wherever

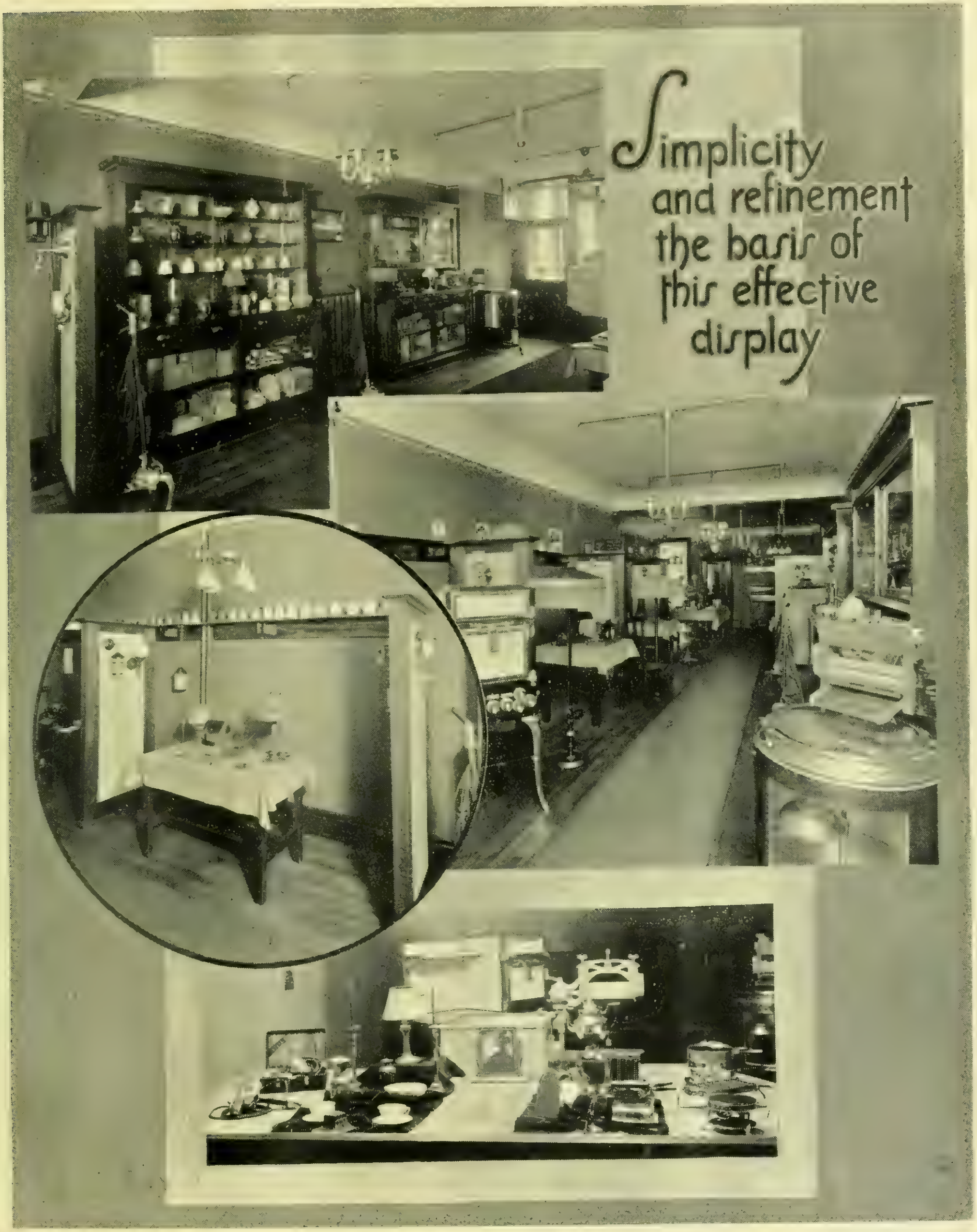
there is electric wiring. It can also be moved, while connected, from the floor to a bench or shelf. Other advantages of this type of pot are that it decreases the fire hazard, eliminates gas odors and fumes, gives absolute certainty in the time necessary to heat a given quantity of solder, insures maintenance of the right temperature and greatly decreases metal loss by burning.

A Hand Vacuum Cleaner

The Wayne Machinery Company, Fort Wayne, Ind., are marketing a new device described as a hand electric vacuum cleaner and motor driven brush. This machine is equipped with a standard type revolving motor driven brush, and a 110 volt universal current motor. The manufactures state that the motor will operate on 220 volt direct current in series with a 60 watt lamp and on any cycle. The discharge is into a dust bag inside the handle; this bag may be cleared by removing the cap on the end of the handle, when with the motor running all cleanings are blown outside. An auxiliary dust bag is included as a regular equipment to be employed where it is desired to clean a long time without emptying.



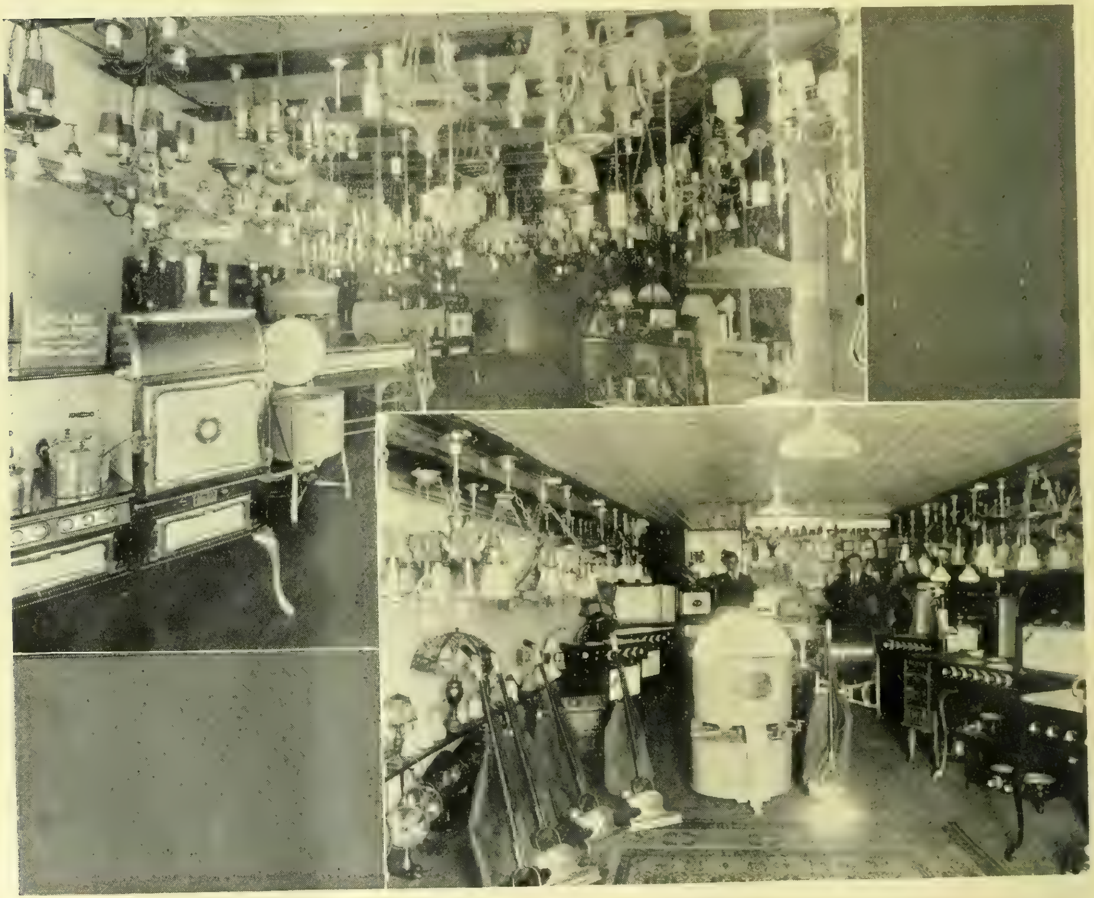
Canadian Electrical Activities, Here and There, in Picture Form


Simplicity and refinement the basis of this effective display

The North Town Electric Shop, Toronto—Above, three interiors and, below, a view through the front window.

They All Attend the A.M.E.U. Convention at Niagara

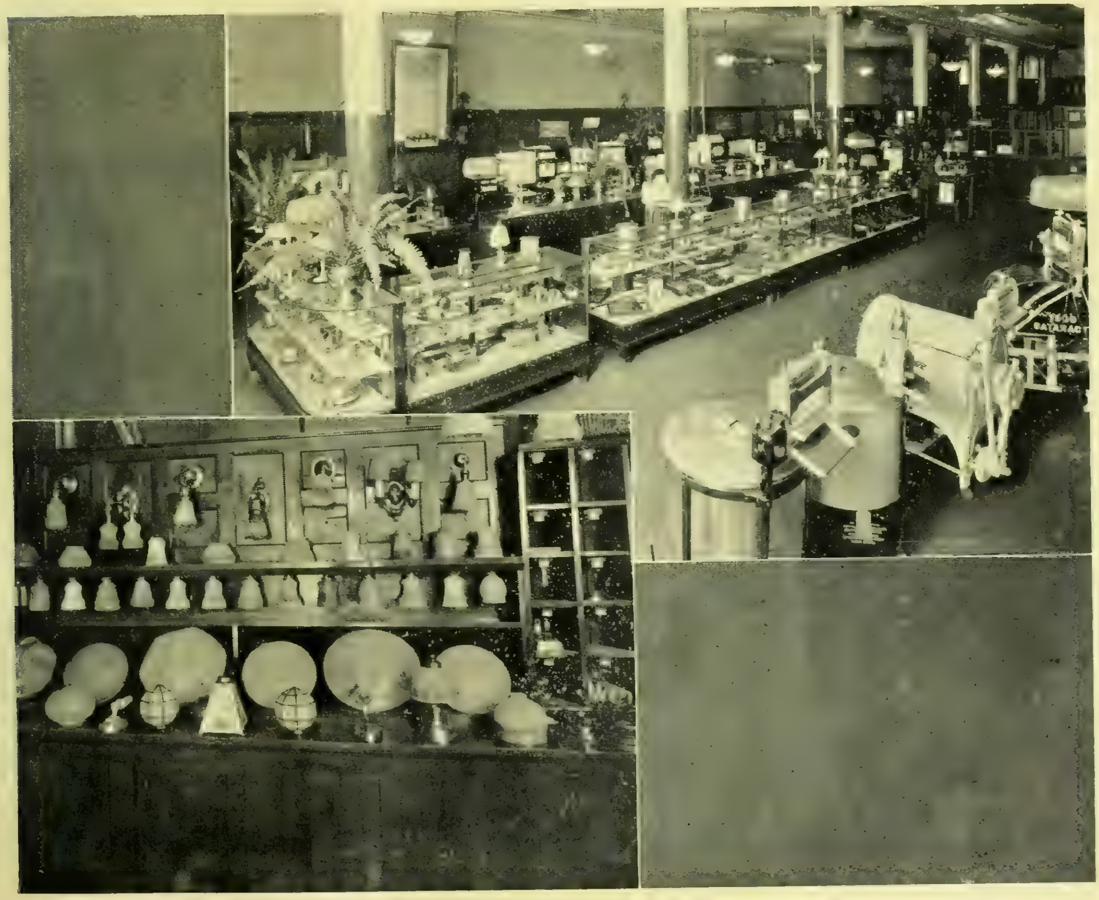
Everybody attends the A.M.E.U. Convention but it's not easy to get them all out on the



Upper—Interior of St. Clair Electric, Toronto; Below—Mattell & Bierwagen's store in Kitchener, Ont.—a contrast in arrangement.

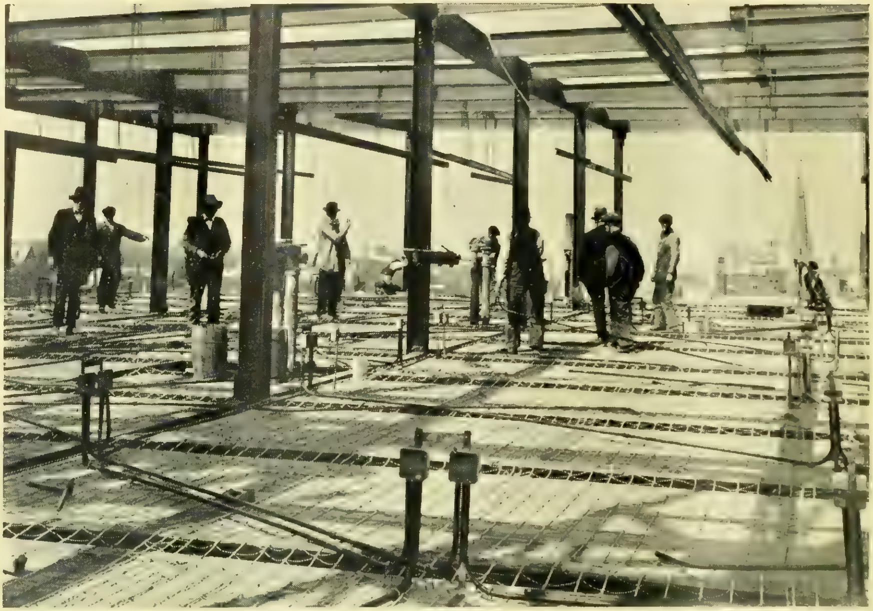
Falls-Some More Fine Electric Store Interiors

lawn at the same time. They come from every town in Ontario where the Hydro is operating.

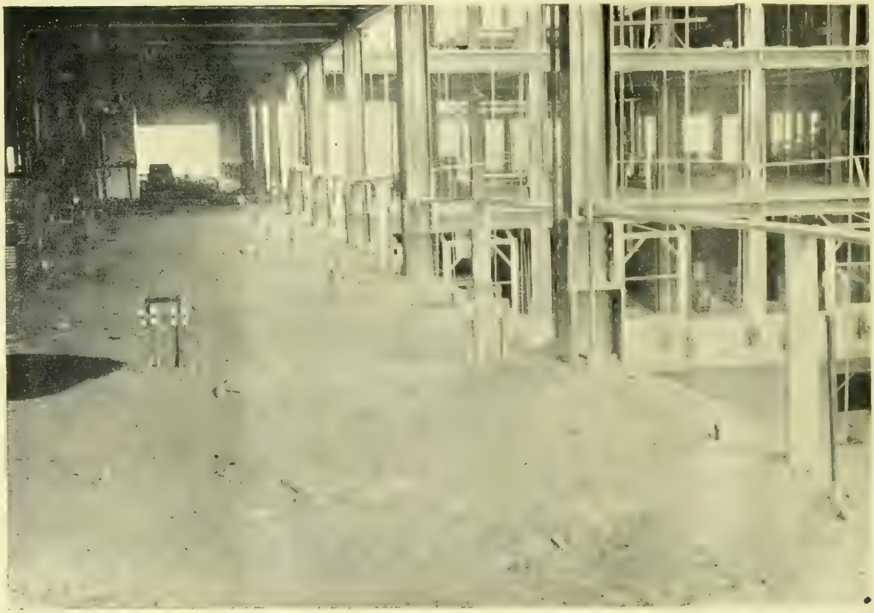


Upper—The main store of the Toronto Hydro-Electric System; Lower—Effective display rack of W. P. Earle & Co., Toronto.

Wiring Canada's Biggest Hotel



Wiring the Mount Royal Hotel, Montreal. Placing conduit on the forms prior to pouring floor slab.



Wiring the Mount Royal Hotel, Montreal. Conduit and outlet boxes in place after pouring floor and removing forms. For complete description of work see article elsewhere in this issue.

Thanks to the Trolley

Under this heading the Winnipeg Electric Railway Public Service News makes the following argument. It is logical and convincing. This form of propaganda, appealing to the intelligence of the citizens, will eventually result in a proper conception of the real relationship that exists between the citizens and their service organizations:

The home owner can say: "My property is more valuable than it otherwise would be because of the car lines which run near it."

The business and professional man can say: "My business is more prosperous because of the four million dollar pay roll of the Winnipeg Electric Railway Company."

The retail merchant and theatre manager can say: "I am able to do more business because the street railway carries my customers cheaply from their homes to my store, or house."

The wage earner can say: "I am able to live in the pretty suburbs and bring up my family amid healthful surroundings because the street car gives me quick access to my employment three miles away."

Then surely the home-owner, the business and professional man, the retail merchant, the theatre manager, and the wage earner must agree that an institution like the street railway, which means all that it does mean to them in dollars and cents, deserves their utmost co-operation and good-will.

Notice Served on Quebec Railway L. H. & P. Company

The City of Quebec has served notice on the Quebec Railway L. H. and P. Company that they must institute a five minute street car service in Belvedere ward within eight days from the receipt of the notice, and start work upon the proposed extensions on Dorchester street, and also on the Charlesbourg Road, before the 1st of August, failing which action will be taken by the City to nullify the contract.

As drawn up and served upon the company the notice contained three points. The first of these calls upon the company to institute within eight days a five minute service of street cars to the people living in the Belvedere ward, the same as is enjoyed in other sections of the city. The second calls upon the company to commence, before the end of the present month, the extension of the tramway line on Dorchester street at Stadacona, passing over the Lavigueur bridge and rejoining the existing line at the intersection of Dorchester street near the Drouin bridge. The third point calls for the undertaking, within the same specified time limit, of the extension of the line on the Charlesbourg Road from Lamontagne Avenue, a distance of some 650 feet. These extensions, it is pointed out by city officials, were to be completed in August, 1920, according to the terms of the contract entered into between the city and the company in 1919.

Circuit Breakers Up-to-Date

"Protection Up-to-Date" is the title of a publication by the Cutter Electrical & Mfg. Co. It deals in an original way with the various applications of I-T-E and U-RE-LITE circuit breakers and the reading matter is balanced with photographs of installations.

The Quebec Gazette announces the incorporation of "La Compagnie Telephone de la Riveire des Prairies, Limitee" with a Capitalization of $10,000, for construction and operations of a telephone system on different parts of the Island of Montreal. Head office, Montreal.

Rolling Contacts for Controllers

The advantages of rolling contacts for control apparatus are described in a publication known as Leaflet No. 3428, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Automatic Load Regulator for Motor-Driven Pulp Grinders

An automatic load regulator to correct the fluctuating load conditions of motor-driven pulp grinders is described in a publication, known as Leaflet No. 1934, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Scientific and Industrial Research in Canada

The report of the Administrative Chairman of the Honorary Advisory Council for Scientific and Industrial Research of Canada for the year ending March 31st., 1921, is just received. The report is signed by M. R. A. Ross, the Administrative Chairman,, but credit is given to Dr. A. B. Macallum, former chairman, for the preparation of the report. Among the items mentioned are reports by associate committees on mining and metallurgy, physics and engineering physics, air research, cold storage, food research, industrial fatigue, & etc. A special report by the chairman is included, in three sections, the first dealing with the work of the Council, the second with the overlapping and duplication of effort in scientific and technical work in Canada and the third with the "National Research Institution."

Trackage Extensions on B. C. E. R. C. Lines

For the first time in a number of years, actual trackage extensions are under way on the system of the British Columbia Electric Railway Company at Vancouver. About a mile of track is under construction on the Broadway West line, and will give a more adequate service to an already well built up and growing district.

The type of construction adopted is first class, with the heavy 8 in. rails that go with permanent pavements. Fir ties are in use, resting on about 9 inches of ballast, commencing with 3 inch stone, and finishing with about three inches of screenings. The same fine material is being used for tamping, after which a course of concrete is to be run in.

One item in which the most modern practice makes for economy is the method of bonding being used. Solid copper wire is used instead of the cable formerly in use, and connection to the rails is by welding, the oxy-acetylene process being used.

Woodstock to Tax Bus Lines

Bus lines operating between Woodstock and Ingersoll which do not travel under the rules and regulations applied to taxis, will have to pay taxes like the Woodstock, Thames Valley and Ingersoll Railway. This was contained in a by-law passed by the police commission of this city following recommendation of the city council at a meeting of that body June 12.

In future any bus line or company wishing to operate in Woodstock or between Woodstock and other points, and using Dundas street or streets on the same general line of the street railway, will have to pay a license fee of $800, which is paid by the street railway. Of this amount $300 is for taxes and the remaining $500 is for the annual rental for a period of ten years starting from 1921.

Current News and Notes

Arborg, Man.

The Manitoba Government Telephones are putting in a new exchange building at this place.

Brockville, Ont.

The Canada Gazette announces the incorporation of Code & Tett Limited, with a capitalization of $50,000 for the purpose of carrying on the business of electrical engineers, contractors, etc. Head office, Brockville.

Caradoc, Twp., Ont.

The township's council is starting the construction of an electric lighting and power distribution system. Work will shortly be started on a section from Delaware to Melbourne, a distance of 10 miles, estimated to cost about $18,000. It is likely that the line will be extended later.

Elmira, Ont.

At Elmira the Hydro rates in 1914 were 9.5 cents for domestic lighting and 7.1 cents for commercial. Now the rates are 3.1 cents and 3.2 cents, respectively. Similar reductions hold for Baden, New Hamburg and Milton. 80 per cent. of the houses in Elmira are wired.

Emerson, Man.

The contract for the lighting requirements of Emerson, Man. has been awarded to B. Manger, Ste 7, Vingolf Apts., Winnipeg, Man. Contract price $12,000. Elec. Engr., George L. Guy.

Grimsby Beach, Ont.

The annual picnic of the Hydro-Electric Power Commission of Ontario was held here recently. Between six and seven hundred persons were present.

Hanna, Alta.

The town of Hanna is putting in an electric power plant. Tenders are being received by the secretary until August 7th., for one 50 and one 100 kw. generator and exciter, two 150 h.p. return tubular or water tube boilers complete including mechanical stokers. There will also be required switchboard, street lighting equipment, transformers, copper wire, &c. The work is being handled by Haddin and Myles, consulting engineers, Calgary, Alta.

Halifax, N. S.

The hearing of the Halifax Tram Company valuation before the Nova Scotia Board of Public Utilities, came to a close after a series of sessions extending over a period of nearly two weeks. The Commission comprises: J. U. Ross, chairman; R. T. McIlreith, K. C., and P. R. Colpitt, city electrician. Experts upon whose opinions much of the evidence was based were, Mr. Moreland, of Jackson and Moreland, engineers, of Boston, who made the valuation for the Public Utilities Board; and W. B. Mackenzie, of Moncton; John Preston, and C. W. Fowler, engineers for the city; L. H. Wheaton, for the citizens group. For the company were L. R. Nash and Major Hayes of Boston.

Kitchener, Ont.

The Kitchener Board of Trade has formally indorsed the bylaw to raise $70,000 by debentures for the purpose of extensions and improvements to the Kitchener street railway in the way of new car barns and new cars. Citizens are showing considerable interest in the plebiscite, and there is every indication that the bylaw will be promptly indorsed by the ratepayers.

Kingston, Ont.

A fire, which started in a three storey building here, caused $20,000 loss. The top flat was occupied by the plant of the Monarch Batteries Company, which suffered $7,000 to $8,000 damage. The building was owned by the Street Railway Company.

Kingston, Ont.

Last year the City Council made an agreement with the Street Railway Company that it would not ask it to do further retracking for street pavement for three years. Citizens now want other sections of the street railway line paved, so the Company will submit to the Council a proposition to continue retracking necessary portions of its line if the city will agree to permit it to increase its five-cent cash fare to six cents. The company says it must increase its revenue if it is to continue making large expenditures on new tracks.

Montreal, Que.

The latest telephone directory is the largest volume of that character ever issued in Montreal. There are approximately 85 000 subscribers.

Mr. H. A. Terreault, the new director of public works, Montreal, has had a 30-million gallon steam pump in the water department, changed over to electric drive. Substantial economies are claimed.

Ottawa, Ont.

An electrically operated dredge, built at an outlay of approximately $175,000 by an Ottawa firm, was recently moved out of Victoria Island shipyard en route for Kingston. It will be used on the Queenston canal.

Picton, Ont.

Hydro service rates were materially reduced by announcement of the Commission Board recently. Domestic rates for lighting and cooking of 6 cents and 3 cents were reduced to 3 and 2 cents per kilowatt, respectively. Commercial rates of 12 cents and 6½ cents were reduced to 8 cents and 4⅛ cents. Power rates of 6.4 cents, 4.3 cents and 0.15 cent, were reduced to 5.6 cents, 3.8 cents and 0.15 cent.

St. John's, P. Q.

The Southern Canada Power Company, has arranged for another manufacturer from the United States to establish a branch factory in the eastern townships. The organization is the Franco-American Company, who are now erecting a large plant at this place.

Toronto, Ont.

Mr. A. D. Le Pan, superintendent, is receiving tenders until Aug. 26th., for a turbo-generator set, to be used in connection with the central heating and lighting system of the University of Toronto.

Three Hills, Alta.

The Provincial Government, Dept. of Telephones, Edmonton, is calling for tenders for the erection of a telephone exchange at this place.

Viking, Alta.

The Provincial Government, Department of Telephones, is calling for tenders for the erection of a telephone exchange at this place. Alternative construction, brick veneer or frame. Plans and specifications with Supt., Edmonton.

Winnipeg, Man.

Miss Marjorie Glassco, 16-year old daughter of J. G. Glassco, general manager of the Winnipeg Hydro system, recently rescued J. Young, an employee of the Hydro, from drowning at Point Du Bois.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Industrial and Financial Outlook

"Conditions at the close of the first half of 1922 indicate that business will expand moderately during the autumn and winter months. It is now one year since the definite beginning of recovery from the depression of 1920-21. Progress was slow until the close of 1921, but since the beginning of 1922 improvement has been rapid. Money is cheap. The crop outlook is excellent. With few exceptions, stocks of raw materials and of manufactured products are not larger than necessary to bridge the normal period between production and consumption. Commodity prices are rising. The movement at present seems to be primarily one of adjustment between the different classes of commodities, and as long as the upward tendency does not assume a speculative character, it is a favorable factor. Except for strikes, there is little idleness. Production has expanded steadily since the beginning of the year, and as yet the usual mid-summer dullness has been little felt."

This latest summary, by the National Bank of Commerce, makes special reference to conditions in the United States, but these should not materially differ from our own. In many ways Canadian conditions are better. An example is the apparently saner attitude of Canadian "Labor" which has not allowed itself to be led into such disastrous strikes. Comparatively speaking, too, our wonderful crop prospects mean more to us, as our western provinces, where the bulk of the grain is grown, have been the weakest link in our credit situation. A good crop will work wonders in all directions and put "heart" into our rural population, where there has been little enough encouragment during the last two or three years.

As another indication of improving conditions, it is worth noting the course of the security market during the present summer. Bonds and stocks, in general, experienced a substantial revival during the first six months of the year and financial men looked for a quiet time during the holiday season, with the probable accompaniment of receding prices. As it has turned out, to-date, there has been little let-up in the amount of business transacted and little, if any, price recession. In a number of directions there have been quite marked advances. This indicates not only that the investor is regaining confidence, but also that he continues to have the money to spend.

There is another phase in the investment situation that is developing in the regular way. The very early stages of a trade revival are invariably preceded, financial statisicians tell us, by a demand for and a consequent increase in the price of high class bonds. At later stages when bonds become less attractive by comparison with industrial securities there is a gradual movement from municipal and government bonds to those industrials. This not only applies to the general investing public but also to the banks and other financial institutions, who in quieter times were quite willing to forego the larger financial returns in order to gain greater security but who, with the returning confidence, gradually relinquish their high class investments for more remunerative securities or so that they may be in a position to accommodate their commercial customers. At the present moment we appear to be well advanced in this second investment stage, indicating that we are following the natural cycle of former periods. With the increased confidence in industrials and larger sums of money available for development comes, of course, a quickened industrial activity.

Nobody looks for and nobody wants a boom, either industrial or otherwise. What we all want and need, and what we seem to have excellent prospects of getting, is a steadily improving condition, both as regards confidence, public demand for commodities, public ability to purchase commodities, and manufacturers' ability to supply them. There is no apparent reason to readjust the forecast we have already ventured in previous issues, that we are steadily moving to normal trade conditions, and will probably reach a condition of stability in the early part of 1923.

The Coming Convention of Contractors and Dealers

Plans are in progress for bringing the electrical contractors and merchants of the province of Ontario—and as many as possible from outside the province—together, in convention, on November 13th & 14th.

What will be accomplished?

Is it going to be the old time convention,—a number of papers read to empty chairs, a little disjointed discussion, a big banquet and much conviviality?

Or are these men coming to Toronto, with serious thoughts of the important nature of their mission and are they going to be met by a bill-of-fare that will send them home fitted to carry on their business like real merchants?

The weak link in the industry is the retail merchant. There are not enough of them and they are not sufficiently well trained. This is nothing to their discredit, for considering the length of time they have been engaged in retailing they have made wonderful strides; that is, they have made a good start, but that is no reason why they should not keep on improving as rapidly as possible.

It will be a fine thing if the contractors and merchants in the electrical industry come to Toronto in November and get acquainted with one another. They will profit by it. Still more, however, they need to get acquainted with up-to-date merchandising methods—such as are practiced by the best in other lines of trade. If they come to this convention as if they were coming to school, and if those in charge of the progam see to it that there are proper teachers provided, and if the discipline of a school is in evidence, with the social element kept in the back ground, more real good will result.

The fundamentals of retail merchandising are the same for all trades. In the shoe trade, the grocery trade, the hardware trade, the jewelery trade these fundamentals have been recognized and practised for generations. Why should we expect to acquire knowledge without experience or study? Why should we not "go to school" to those trades that have hundreds of years of experience behind them? Why should we in the electrical industry delay while the hardware man, the jeweler, the grocer and the druggist establish themselves as retailers of electrical equipment.

"Merchandising" is the weakest spot in our electrical anatomy. The November convention offers a splendid opportunity to improve the status of the electrical merchant by giving him two solid days of educational training in the fundamentals—such things as accounting, overhead, service, advertising, salesmanship, personality. Provide, as teachers, the most successful merchants to be found in Canada. Demonstrate that retailing is a science. Convince every delegate that he is engaged in a business that can be made to command the respect of the public while at the same time it will yield a fair return for all the investment in money, brains and energy that is put into it.

Face to Face With Prosperity

Winnipeg, August 8.—Grain companies, mills, railroads and the Lake Shippers' Association are just now feverishly preparing to handle what is expected to be the largest grain yield in the history of the Canadian Northwest. Rolling stock is being borrowed from eastern divisions and the banks are accumulating surpluses of cash at small branches from the lakes to the mountains in preparation for the big movement.

Official statistics from the grain exchange show the wheat acreage of the three provinces to be 21,146,000. In 1915 the acreage was 13,867,715. The average yield per acre then was 25.97 producing a yield of 360,187,000 bushels. The most optimistic, however, does not anticipate a yield so high this year. For ten years, however, the average has been 17 bushels. Upon this basis the yield this year would be 359,822,000 and this is the minimum that well informed sources expect will be produced.

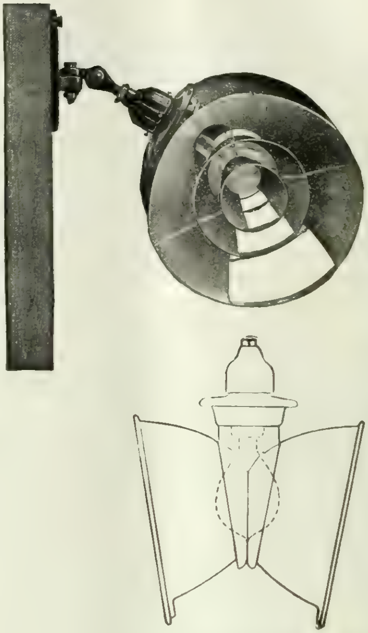
The question on October wheat, say July 10, 1915, \$1.03⅜. July 10 this year October wheat quotation was \$1.16¼. On the basis of this quotation this year's crop ought to yield at Ft William, \$417,393,520 or in cash, \$47,250,000 more than the famous 1915 crop. The amount that would reach the farmers' hands would be, in cash, \$327,438,000 because it costs 18 cents freight and six cents elevator charges per bushel to handle to head of the lakes. Approximately this amount of cash will be released through ordinary business channels in the west this fall.

Of course this is a debt-paying crop, but if conditions today continue it means that the books will be cleaned and all paper liquidated.

A Highway Lighting Fixture

A new fixture for highway lighting, that gives great promise, is shown in the illustration.

The fixture consists of a nest of 6 parabolic reflectors mounted in series of threes. A 250 candle power lamp is used. The reflectors are so arranged that practically all the light is driven outward along a narrow path which illuminates the roadway only, allowing no light to escape into the surrounding areas. These units are mounted about 30 ft. above the road-bed and from 300 to 600 feet apart. It is claimed that at any point on the road, so lighted, a fine print newspaper can be read with ease. The Central Station has an interesting article on this subject by Reginald Trautschold, M.E., of the Society for Electrical Development, and in this article some interesting figures are given.



C.G.E. A Highway Lighting Unit that gives much better average illumination with ten candle power

In the brightest lighted streets of first class cities, with lighting standards placed about 70 feet apart, the average intensity of illumination at breast level is .135 foot-candles, the maximum being .96 and the minimum .105 On residential streets, with an aggregate of 10 000 candle power per mile, the average is .068 foot-candles, the maximum .347, and the minimum .01. With the new highway lighting fixtures spaced 400 feet apart, the illumination intensity is .10 foot-candle on an average, .25 as a maximum, and .025 as a minimum.

These latter figures, it will be noted, are 48% higher on the average, 28% less for the point of maximum illumination, and 150% greater for the point of minimum illumination, than the figures for the well lighted urban residential streets. In other words—with 3,250 candle power per mile, using the new units, the lighting is considerably greater on the average and also much more uniform than when present day lighting of 10,000 candle power capacity is used.

The Application of Electricity in the Manufacturing Industry*---5

Almost Every Factory Uses Electric Heat—A Description of Heater Types Evolved for Various Purposes

The industrial oven or furnace consists essentially of some electrical resistor material and some heat insulation materials carried in a metal frame for their mechanical support.

The electrical resistor materials in greatest commercial use are:

(1) Nichrome. This is an alloy consisting of from 60 to 66 per cent. of nickel, 12 to 22 per cent. of chromium 26 to 10% of iron and 2% of manganese. Resistors made of this material have a maximum working temperature of approximately 1,800° F.

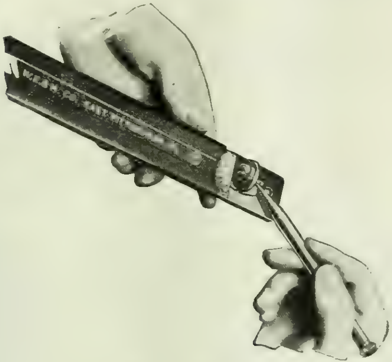


Fig. 1—Space Heater

(2) Chromel, or No. 1 chrome nickel alloy. This consists of 80% nickel and 20% chromium and contains no iron or other impurity. It is highly acid resisting and has high resistance to oxidation. Resistors made of this material have a maximum working temperature of approximately 2,000° F.

(3) Nickel steel, or ferro-nickel alloy. This contains 25% nickel and 75% iron. The resistors have a maximum working temperature of approximately 1,100° F.

(4) Copper nickel alloys. These contain from 45% to 65% of nickel and 30 to 55% of copper. The resistors have a maximum working temperature of from 900 to 1,100° F., and they have a practically negligible temperature coefficient of resistance.

(5) Carbon—granular or plate. These resistors have a maximum working temperature probably in the neighborhood of 5,500° F.

(6) Carborundum. This has been tried to some extent experimentally, but has not been a great success commercially.

Heat Insulation Materials

There are a great many heat insulation materials used commercially, such as:—

(1) Mineral wool—a product of silica, alumina and iron oxide, made by blowing a powerful jet of air or steam through melted blast furnace slag.

(2) Insulating bricks of various kinds.

As refractories, that is, close to the heating elements in high-temperature furnaces, different types are used. Some of the insulating bricks weigh about 30 lbs. per cubic foot, whereas the refractory brick weigh about four times this amount.

Commercial Types of Heating Elements

(1) Grid heaters—nickel steel—for immersion in oils fats and greases.

(2) Cartridge type heaters. These consist of nichrome resistors, wound on fireclay insulation and mounted in brass shells of various diameters to fit different sized holes. The wattage runs from 75 to 1,000 per heater and the maximum operating temperature is around 800° F. These heaters are used in special machinery applications, largely in the rubber and shoe industries.

(3) Steel clad and space heaters. These are so named because the heating elements are encased in steel and are designed to economize in space occupied. Mica insulation is employed. For the space heater, a mica sheet is rolled into a tube onto which the nichrome resistance ribbon is then wound. The tube is flattened and terminals are placed at each end. The flattened tube is then placed in a mica sheath, which in turn, is placed in a heavy sheet steel sheath.

The space heater Fig. 1, is employed in a great variety of applications. It may be assembled in any desired number, depending upon the purpose for which it is to be used. One particular use is for air heating purposes. Other applications of the space heater or steel clad heater are in foot-warmers, such as used in traffic regulation, industrial hot tables and

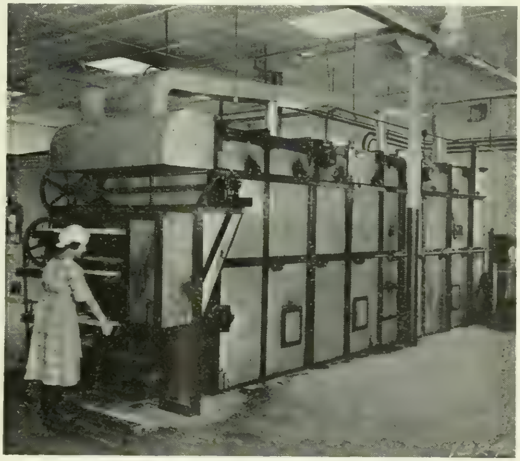


Fig. 2—Sectional type of electric bread oven

restaurant grills, heating of water tanks, mangle shoes, and heating of pattern plates in moulding machines.

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*For much of the information in this article we are indebted to a paper read before the Toronto A.I.C.E. by Mr. J. L. McK. Yardley, Westinghouse Electric Mfg. Co.

(4) Industrial oven heater. This consists of nichrome resistance ribbon wound on fireclay insulators and mounted in a steel rack frame of open construction. The element is made in various sizes from 1-3/4 to 5 kw. for 110/220 volts. The maximum operating temperature is around 900° F.

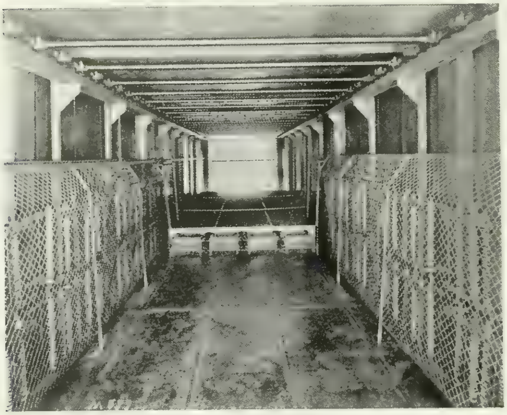

Fig. 3—An enamelling oven

Oven Control

As previously indicated, this is secured by means of the thermocouple and thermostat. For a small industrial oven installation a single section control panel is employed—for example, such as for a capacity of 40 kw. or the equivalent of 120 amperes, 3 phase, 220 volts. For larger oven or furnace installations, individual section control panels are grouped into a board. For example, 2,200 kw. of heaters at 550 volts employed in air heating in a large cotton mill of the Canadian Cottons Company, near St. Stephens, N. B., are controlled from two switchboards into which the individual sections are grouped. When grouping the control in this way, the sectionalizing switches are usually segregated at one part of the board and the main automatic control contactors at another part..

Types of Ovens

(1) Electric range for the household. In connection with this it is interesting to mention that over a test period of six months, the average monthly power consumption for 24 families of four to six persons each, under observation, was 100 kw.h.

(2) Bread baking oven—real type. One commercial size bakes 120 one-pound loaves in a 35-minute bake. This is equivalent to 175 loaves per hour. The input being 25 kw. seven loaves, or seven pounds of bread are baked per kw.h. The loss to maintain oven at temperature amounts to from 7 to 8 kw.

(3) Enamelling ovens—relative efficiency—mostly at 400 to 500° F.

(a) Kiln type oven—hand operated, 6 to 8 lbs. of work per kw.h.

(b) Kiln type oven—truck operated, 10 to 12 lbs. of work per kw.h.

(c) Semi-continuous conveyor type, 10 to 12 lbs. of work per kw.h.

(d) Continuous conveyor type, with air seal or exhaust fan, 25 to 30 lbs. of work per kw.h.

Bread Baking Oven

In the reel type, by rotation of the reel, every loaf is baked equally by the heaters located in the bottom of the oven. The oven is of course completely equipped with automatic control. The sectional type, Fig. 2, is made in several sizes of from about 20 to 60 and 100 loaves per second. The idea is for the baker to buy one or two sections or hearths according to his needs and then add sections later, as his bakery grows. Each section is heated from top and bottom and is provided with independendent automatic control.

Kiln Type Oven

This type of oven is largely used in the electrical industry and in the automobile industry. Fresh air coming in at the top and passing through the heating elements at the side of the oven takes up the vapors which are heavier than air and is exhausted from the bottom. This type of oven is also largely used in furniture enamelling. Lithographing requires a large volume of air on account of the drying nature of the process. Baffles with slits for admitting air to the interior of the oven are provided extending from the bottom to the top. The slits are arranged for directing the flow of air through the work.

Continuous Conveyor Type

This type of oven is also extensively used. A large oven is installed at the Royal Typewritter Company for the enamelling of typewriter frames. At the Buick Motor Car Company plant, an oven of 1,550 kw. capacity is installed. Fig. 3, gives an idea of the length of this oven. The heating elements are all protected by screens. On the entering end they are mounted on the side walls, while on the exit end the heaters are mounted on the floor. The reason for mounting them on the side walls on the entering end is that the work drips to some extent while passing through this part of the oven.

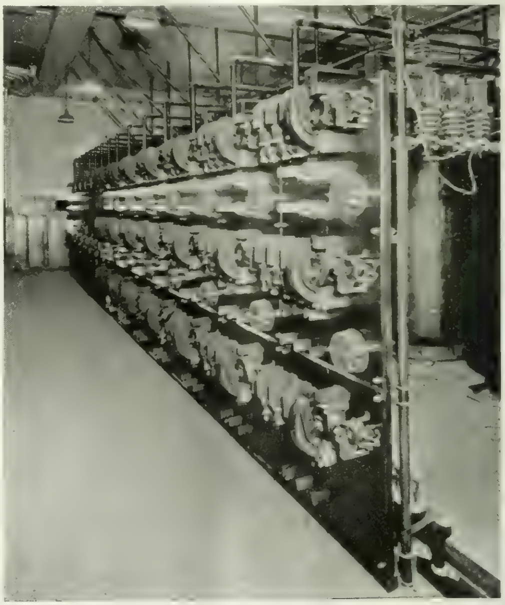

Fig. 4—Large oven temperature control panel

A very large oven of this type is installed in the Cadillac motor factory. Separate exhaust flues from the different sections of the oven are brought outside of the building. The automatic temperature control panel for this oven is shown in Fig. 4.

Solder and Babbitt Pots

A 30-pound [illegible] heat solder pot consists of a cast iron shell, lined with 1-inch moulded insulation. The heating elements are directly underneath the cast iron pot, and are insulated by 1-1/2 inches of Nonpareil brick. The brick is placed directly in contact with the heating elements and above the wires so that all connections are amply protected. With terminals at the bottom, it is well arranged for conduit attachment. About 1,300 watts are required to bring a 30-pound charge to temperature in 55 minutes; 650 watts is ample to keep the charge at temperature. Fig. 5 shows a 750-pound solder pot under automatic control The thermocouple is in the rear and the electrical connections are at the right..

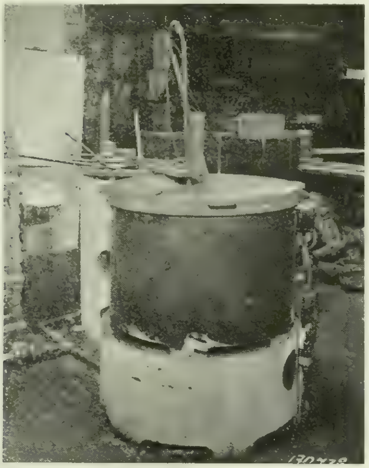

Fig. 5—An electric heated solder pot

Industrial Furnace—Heviduty Type

Furnaces of this type employ heating elements of chromel metal. These elements are placed in grooved refractories or muffle plates of special composition, which is a good dielectric and at the same time is a good conductor of heat. All terminals and connections between, heating elements are made on the outside of the furnace. Fig. 6 shows a small industrial furnace having an opening 12 inches wide, 19 inches long and 6-1/4 inches high. This furnace is for annealing and tempering and has a maximum demand of 9-3/4 kw. at 110 volts.

It is obvious from the type of construction that there is no reasonable limit mechanically or electrically to the size to which this type of furnace may be built. In the larger furnaces of course a substantial framework is required to carry the weight of the refractory and heat insulating brick. Fig. 7 shows a comparatively small annealing furnace of the Hevi-duty type. This furnace has two heating chambers, each 6-1/4 inches deep x 65 inches wide x 1-1/2 inches high. The heating elements with their special refractories are divided in three sections, one below the bottom chamber, one between the two heating chambers and the third just above the top heating chamber. This furnace is working on the heat treatment of turbine blades—about 200 pounds of copper per hour being heated to 1,200° F. In this case automatic temperature control is not employed and the furnace is operated at a considerably higher temperature than 1,200°. The attendant, however, watches the operation closely and quenches the blades when they have reached proper temperature. The maximum demand is 20 kw. at 220 volts.

The field for this type of furnace is very extended indeed, being limited principally by the fact that the resistor itself cannot be operated for any appreciable length of time over 2,000° F. Despite the business depression, an increasing number of these furnaces is being installed. Definite arrangements have been recently made for the installation of the following furnaces:

(1) 60 kw. furnace for treatment of wire.

(2) 210 kw. furnace for vitreous enamelling.

(3) 33 kw. furnace for lead bath treatment of steel saw blades.

(4) 220 kw. furnace of car bottom type for the heat treatment of locomotive parts—piston rods, crank shafts, etc.

Forging Furnace Carbon Plate Resistor Tpye

In searching for a resistor material which could be used in furnaces for application requiring temperatures above 2,000° F., and after a number of unsuccessful attempts had been made to use carborundum or silicon carbide for such work, a furnace was devised in which the resistor element consists of a pile of carbon plates held together by spring pressure. One of the earliest conceptions of this type of furnace is shown in Fig. 8. This furnace has been kept at a forging temperature of 2,300° F., for six weeks at a time and has been used in an extended operation, heading bolts. It takes from 16 to 40 kw. 1,000 to 1,200 amperes over a 20 to 60 volt range. In the operation of heading bolts, the input was from 16 to 22 kw. for small and medium sized bars. The carbon resistor plates are 6 inches x 2-1/2 x 1/4 inch thick and the pile of plates is held together by 200 pound spring pressure. The heating element has been found to handle 100 kw. safely. Water-cooled bronze terminals are provided. The roof above the element consists of four-inch x four-inch carbon bars covered by from 6 to 8 inches of carbon dust and two layers of ionsulating brick. Carbofrax and firebrick are used in the side wall. It was found that the element must be protected by oil or gas flame from oxidization in order to have reasonable length of life. One gallon of oil, or 100 cu. ft. of gas per day was sufficient.

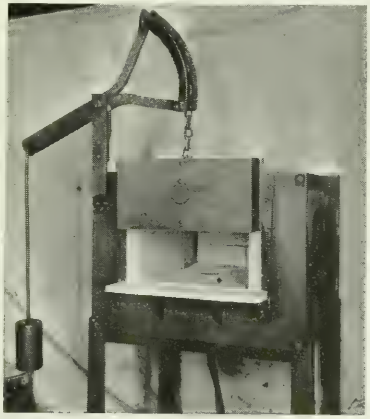

Fig. 6—An industrial furnace

High Frequency Inductive Heating Furnace

With high frequency inductive heating, temperatures above 2,550° F. are readliy obtained without carbon being essentially associated with the operation of the furnace. This type of furnace seems to have a multitude of applications. One of these is the melting of metals and alloys where low volatization losses are essential, as in the case of molybenum, platinum, gold and silver alloys. It may also be used in graphitization work. The carbon blocks to be graphitized are imbedded in lamp black or carbon black. It may also be used in the heat treatment of knife blades and thin steel sheets. One of the miscellaneous applications which have been suggested is in the manufacture of centrifugal castings.

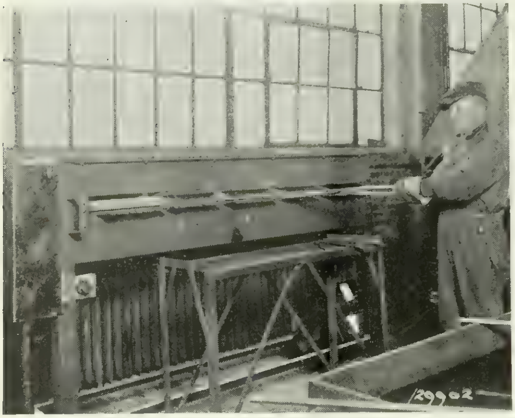

Fig. 7—An electric annealing furnace

In order to provide high frequency power required for this type of heating, a frequency converter is employed for sizes up to 20 kw. per phase, which consist of an oil cooled transformer with internal reactance, a set of static condensers, and a metal discharge gap. For larger capacities, it seems probable that a high frequency alternating current generator will be required. Such generators are obtainable and in fact have been built.

Industrial Heating Applications—Future

It seems unquestionable that the field of industrial heating by electricity will extend greatly, owing to the superior results of one kind or another usually experienced. It will accordingly extend particularly in the industries in which it has already started.

Glass annealing will undoubtedly be done to a much greater extent by electricity. A total possible connected load of 60,000 kw. has been estimated. In the textile industry, the slashers, tentering machines and singeing machines will probably be electrified, as well as the dye vats and various other applications. In considering the extension of electric heating into this industry, the following advantages have been indicated:

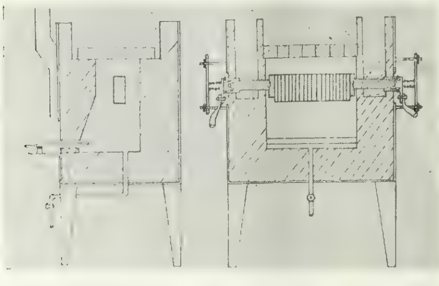

Fig. 8—Carbon plate resister type

(1) More uniform heating of liquids, dyes and size.

(2) More uniform consistency of liquids in dye vats, etc.

(3) Elimination of steam piping and its losses.

(4) Higher temperature, taking the place of additional dry cans in increasing production.

(5) Higher temperatures are desirable in calender rolls and more uniform temperatures throughout rolls than obtainable with steam or gas heat.

In the paper industry, particularly where power is cheap or waste hydro-electric power available, there should be further use of electrical heat. This will probably be in the clyinders of the board machine, in the calenders and in the general steam requirements.

Even the time honored lime kiln is likely to be invaded by the metallic resistor heating element some time when waste or cheap hydro-electric power is available. In the modern coal fired lime kiln, 500 to 1,000 pounds of coal are burned per ton of lime produced at a temperature between 1,100 and 1,650 degrees F. An electric lime kiln has been projected, employing metallic resistor heating elements in a locality where fuel for the fuel fired kiln is difficult to obtain, and some excess hydro-electric power is available, and it is expected to obtain a ton of lime at an expenditure of about 3,400 kw. hours.

At the present time the field of industrial electric heating has barely been touched upon. The applications which have already been made are many, but these have permeated only a very little way into the broad field of industry. Every factory, every workshop, indeed, every establishment that produces anything, of whatever nature, is a potential user of electric heat. A survey of the possibilities would indicate that the saturation point in this field is as far away as to defy calculation. Our electric power is abundant and cheap and our coal supply is not—a fact indicating that there is a wide market and a strong demand for industrial electric heating in Canada.

Ontario H. E. P. C. Acquires Power Rights; Some Rates Reduced

Following a meeting of the Ontario Hydro-electric Power Commission recently, Sir Adam Beck, chairman, issued a staement announcing acceptance by the Commission of a lease of the power rights on the Trent Valley waterways, from the Dominion Government, at an annual rental of $24,000 for a minimum of 6,000 and a maximum of 12,000 horsepower. The lease contains a conditional clause which guarantees that the agreement will not prejudice Provincial rights in the ligitation now pending between the Provincial and the Federal authorities over the disputed ownership of the waters concerned.

Preliminary announcement of important changes in the rates paid by consumers of Hydro power throughout all sections of the Province where the Hydro operates was made recently. Reductions in domestic, commercial and power rates to consumers will affect 67 municipalities, while increases have been made in 46. The Commission has also made a strong bid for the revenue now accruing to the gas companies from the sale of gas for cooking purposes by reducing the follow-up rate on power sold for domestic consumption from a maximum of 4 cents per kilowatt-hour to 2 cents. This change involves 48 additional municipalities, all of them outside of the cities, and brings into force the 2-cent maximum for this form of service over the whole of the Province. During the interview in which Sir Adam announced the changes, the Hydro head stated that this move had as its object the stimulation of the use of electrical appliances of all descriptions.

Thermal Load Indicators for Transformers

Burnout Losses Might be Avoided to a Great Extent if Accurate and Continuous Knowledge of Maximum Load Could be Obtained*

For various reasons distribution transformers are fused to-day from 100% to 200% over their capacity. On this account there is a considerable loss through burnouts which might be avoided if accurate and continuous knowledge of the maximum load on them can be obtained. We watch our generators and power-house transformers closely, and protect them with relays, but the distribution transformers have not received a proportionate amount of attention.

It is well known that a transformer operated near the safe maximum temperature has its life considerably shortened. With new usages of electricity, such as range and appliance loads, becoming more pronounced, this may easily occur when the method of testing the load at the supposed peak period is followed. A test made on a winter evening would not show any load on the network due to ranges, toasters, etc. There is also a certain percentage of loss due to damaged insulation, caused by surges or lightning that I am convinced takes place over a reasonable period of time, enough to allow a damaged transformer to be located and removed for repairs before the trouble has gone far enough to require complete re-winding if an inspection could be made shortly after a thunderstorm in the vicinity.

A real need exists for a simple piece of apparatus that can be attached to each transformer permanently which will give an indication of overload or trouble in the transformer.

The practical limit of loading for distribution transformers is reached when the bottom spot in the transformer reaches the safe operating temperature for the class of material composing it. It is difficult in the field to actually measure this, and the next best place to get an indication of this temperature is from the oil. There are two main variables in the relationship between oil and hot spot temperature; construction and ambient temperature. The effect of the latter is to a certain extent dependent on the former, but it is not difficult to find the allowable maximum oil temperature under the most adverse conditions for any type of transformer. From the oil temperature it is possible to obtain a constant indication of the loading of any transformer, and devices coming on the market accomplish this in two main ways, positively and negatively. That is to say, they measure the actual temperature in degrees, or indicate that a predetermined temperature has not been reached.

There are other devices which operate on the electrical input or output on a thermal basis, giving a record of the highest load over a specified time period.

The chief requirements of a permanent device to indicate transformer loading are:—

(1) Low first cost.
(2) Reliability.
(3) Positive indication.
(4) Low operation and maintenance cost.
(5) Easy calibration.
(6) Easily read and re-set.
(7) Simple and waterproof installation.

(1) Low First Cost.—The amount that can be spent to fully equip a system of transformers, inspect, and keep a suitable system of records, needs to be carefully worked out in each individual Company from their costs of any testing or load record system in force at present, and a careful analysis of the yearly transformer losses to separate the avoidable ones; only these should enter into this part of the calculation.

As an example.—When the company operates an efficient transformer repair shop, the cost of any load testing system in force plus 50% of the value of the avoidable burnouts would give an annual amount which could safely be spent on a thermal protective system with the expectation of saving. That is, the carrying charges, interest and depreciation on the value of the devices, plus the annual operating and maintenance charges, should be less than the aforementioned sum.

(2) Reliability.—A high order of accuracy is not essential, an indication within 5 degrees C.—will be within the error in the assumed difference between hot spot and oil temperature; particularly if the ducts become clogged, or in zero weather.

(3) Positive Indication.—Fully as valuable information as the knowledge that a transformer is overloaded is available when the load carried has been indicated by the temperature, as underload transformers are easily picked out, and put where they can be worked nearer capacity.

(4) Low Operating-Maintenance Cost.—The indication of the device should be easily seen from the ground to allow of quick inspection. The device should be rugged, to stand shipment with the transformer, and movement of the cover for oil inspection, changing taps, etc.

(5) Easy Calibration.—The device should be easily set to operate at any temperature when it belongs to the negative class.

(6) Easily Read and Reset.—This does not apply to the negative class read from the ground, but where the indication is positive it must be kept in mind that the device will probably be read and reset by a lineman wearing spurs, with only one free hand.

(7) Simple and Waterproof Installation.—The device should be easily installed in the field on transformers already in service.

The various devices available at present for this work are as follows:—

Electrical.—Lincoln Demand Ammeter.
C.G.E.-H 2 Ammeter.
Negative Class.—"Standard" Semaphore.
"Westinghouse" Semaphore.
"C.G.E." Thermotel.
Positive.—Clinical or Stricture Thermometer.
Packard Transformer Temperature Signal Thermometer.

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*From report of the Overhead Systems Committe, C.E.A. Convention.

An issue of $450,000 Matchewan Power Co., Ltd., first mortgage 7 per cent 15-year sinking fund gold bonds is being offered at 95, with a bonus of 20 per cent of common stock.

Arthur Vilbert Burr, aged 33, of 80 Brownlow Avenue, Toronto, died recently. Deceased was born at Bloomfield, and attended Hamilton Collegiate and McGill University. He graduated as an electrical engineer in 1913. He had been employed by the Canadian General Electric Co., and the Firestone Tire and Rubber Co. At the time of his death he was an electrical engineer in the employ of the Herbert Morse Crane and Hoist Co., of Niagara Falls, Ont.

Long Distance Telephone Service Extended to the Northern Parts of Manitoba

F. W. BROWNELL*

One of the most interesting parts of the Province of Manitoba is now receiving telephone service which brings the people who are residents of that place in much closer touch with the more settled areas of Manitoba. I refer to the Long Distance service which has recently been extended and is now serving in the way of toll stations at three points on Big Island, viz., Danielson, Hecla, and Gull Harbor.

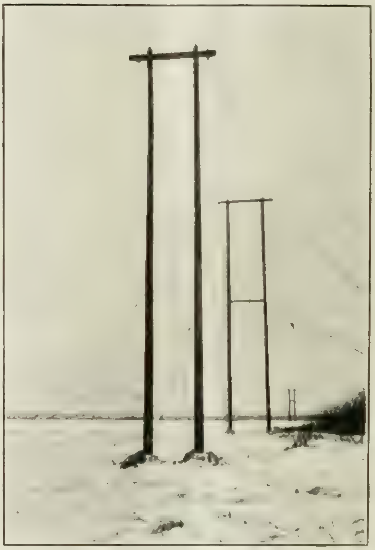
Hecla Island, better known as Big Island, is in Lake Winnipeg. Its western shore is in close proximity to the mainland, near the post office of Howardville, which is nine miles north of the town of Riverton. This is the terminus of the Canadian Pacific Railway line north of Winnipeg, known as the Winnipeg Beach Sub-division. The island is seventeen miles in length and of an average width of three and one half miles. The western shore is low with hay flats and marshes, but the eastern and southern portions is more elevated and better adapted to farming and stock raising. The higher parts are well wooded with poplar, spruce, birch, etc. The shore is underlain by limestone, which crops out at the north portion of the island. The remaining soil consists of a re-assorted glacial deposit, clay with some sand Boulders are seen on the shore, especially to the south. Shoals occur south-west of the island, extending at least two miles from the shore. Nearly all surveyed sections are occupied by settlers of the Icelandic colony.

A view of the line in wooded country

This island is particularly interesting by reason of the fact that it affords a stopping place to the many activities of the great north country, which on account of its isolation and sombreness into the great unknown, so to speak, always arouses ones keen interest and imagination, and after a few trips into its great wastes one always feels the magnetic allurement of returning again.

On the east coast, from Danielson to Gull Harbor, there existed as road only a winding trail, and before a pole line could be staked out arrangements had to be made with the Municipality of Bifrost to have a proper road surveyed and registered. This being done, a road with an average width of thirty three feet now exists.

Between Hecla and Gull Harbor, on account of the limestone formation, the pole holes had to be blasted. This involved the use of explosives, and a small crew of men who were familiar with that work were engaged.


Crossing poles well guyed and anchored

The most interesting feature in connection with this project are the aerial crossings which were erected to span the Grassy Narrows. The crossing at the West Narrows is six hundred and eighty feet and the crossing at the East Narrows is eighteen hundred feet. On the shorter crossing sixty-foot poles, arranged "H" fixtures, were used. On the large crossing, in addition to the dead ending "H" fixture poles, "H" fixtures of ninety-foot spliced poles were used for supporting suspension insulators. No. 8, B. W. G. special galvanised steel wire, with a breaking weight of not less than four thousand pounds was used on this crossing. The crossing poles have been well anchored and guyed, there being used for the two crossings a total of thirty six seven-foot anchors. The poles in each case were placed at a depth of eight feet, the formation at this depth being hard clay. The construction work north from Riverton necessitated a great amount of tree cutting, and at many points it was necessary to brace the poles by reason of the pole line going through muskegs. In digging the pole holes through these muskegs fourteen-inch Iwan post hole augers were used to excellent advantage. By use of these augers the soil is kept intact and the pole is immediately set before any quantity of water fills in.

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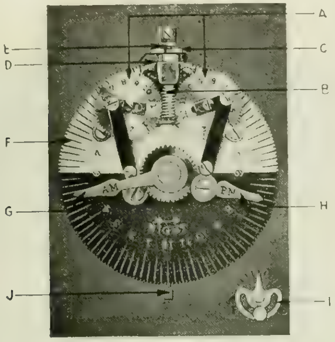
*Superintendent of Construction, Manitoba Telephone System.

A Street Lighting Time Switch that Allows for Seasonal Variation

In the course of an address delivered by Mr. M. B. Hastings, of A. H. Winter Joyner, Ltd., before the recent convention of the A.M.E.U. at Niagara Falls on the subject of "Modern Street Lighting," the speaker described a new development in an automatic time switch, specially designed for turning street lights on and off at predetermined times.

The ordinary automatic time switch has to be set periodically according to the lighting schedule, which is regulated by the varying seasons. The interesting point brought out by Mr. Hastings was that there is now available what is known as the "Season Changing Device," for the Anderson electrically operated switches. This device follows the sun and automatically controls the clock mechanism, so the lights are turned on and off at the same time, relatively, throughout the whole year. The following details covering this switch, taken from Mr. Hastings' remarks, are of interest.—



Season changing device

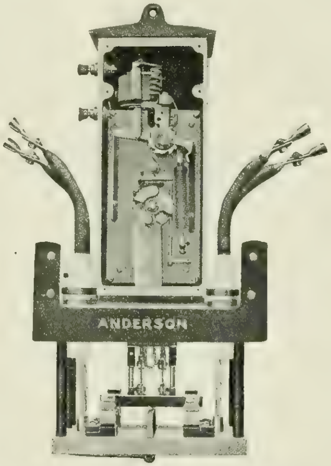
"When the time switch leaves the factory, the season-changing device has been adjusted for correct operation at the latitude where the switch is to be used, if known. Otherwise it is adjusted to the latitude of Boston—approximately 40 degrees north latitude. The latitude changing is done by lengthening or shortening of the cranks on the two small dials "A." This can be done by first loosening the center screws, when the cranks may be moved in or out, as required. This adjustment is difficult to accomplish, and should not be attempted in the field, but should be done before the switch leaves the factory.

"After some time has elapsed between the date of shipment of switch and the time of putting the same in service, it will be necessary to adjust the season-changing device to the correct date when the switch is started to operate. To facilitate this adjustment, the two dials "A" are numbered from one to twelve, indicating the months of the year. These dials "A" may be turned to any position by revolving the screw "B" with the wheel "C," and should be done as follows:—

"First, turn the screw "B" until the pointers "D" are at the numbers on the dials "A" that correspond with the month of the year at the time the device is put into operation. Then turn the wheel "C" to the right one-fifth of a revolution for every day of the month that has passed, previous to the device being put in operation. Then turn date of setting the device. For instance, if the device is to be set to start operation on September 4th, wheel "C" should be turned until the pointers "D" point to the figure 9 on the dials "A." Then turn wheel "C" to the right four-fifths of a revolution, and the season-changing device will be correctly set for September 4th.

"The bearing of the screw "B" is provided with a frictional stop, so that each fifth of a revolution—which represents one day—can be easily detected. The wheel "C" has five teeth, each of which represents one day, which further simplifies this adjustment. Always see that the wheel "C" is left with one slot toward the front, as otherwise the pin "E" that engages the wheel "C" would become disengaged, which would stop the operation of the time-switch. This pin "E" also acts as a pointer for indicating on the 24-hour dial the time of day. As part of the dial "F" is covered by the season-changing device, an additional pointer "J" is placed at the lower edge of the dial "F" to make easy the proper setting at correct time, of the time switch. To set the clock at the correct time turn the 24-hour dial to the left as indicated by the arrow.

"The two pointers "G" and "H" are for setting the switch at the desired time of operation, and are frictionally connected to the levers that operate them, so that they can be moved to the desired position easily with the fingers. One of these pointers is marked "A.M." and the other "P.M." to indicate which should be used for morning and evening operation.



The Anderson electrically operated switch

"The regulating lever "I" is for regulating the clock. To do this, loosen the thumbscrew and move the pointer either towards "F" (fast) or "S" (slow), as desired.

"When correctly set in accordance with the above directions, the instrument will follow the sunrise and sunset with a maximum error of about fifteen minutes from sunrise on August 15th and a similar error of fifteen minutes for sunset on May 15th, but will be practically correct on December 15th and June 15th."

A Dominion Convention of Electrical Contractors and Dealers will be held in Toronto on November 13th and 14th.

Radio Reception on Moving Trains

Canadian National Railways are Experimenting with Receiving Apparatus on their Toronto-Ottawa Trains and have met with Encouraging Degree of Success

By J. D. McLELLAN*, B.A.Sc.

Radio communication is still in its infancy. Much has been learned in the past few years of its wonderful possibilities, but there still remains an enormous field for research. One of the uses which offers a large scope for investigation is the application of this method of communication to moving vehicles. In the near future it will be possible to drive along a country road to the tune of a concert being broadcasted by a station a number of miles distant, or to ride in a railway train and listen to a speech which is picked up out of the atmosphere as the coach speeds along at 60 miles an hour. It will be possible to send messages to friends and to business associates from railway trains and to receive messages sent which have been picked up by the radio receiving apparatus on the train.

The Canadian National Railways are endeavoring to accomplish this by running a series of tests and experiments with radio receiving apparatus on board a moving train. The tests are being made on the trains running between Toronto and Ottawa with the co-operation of broadcasting stations at both cities. The first step desired is to supply passengers with concerts, late news, market reports and sporting results. When this point has been satisfactorily reached it will naturally lead on to what now appears more difficult to obtain on a commercial scale, that is the sending and receiving of business messages to and from a moving train.

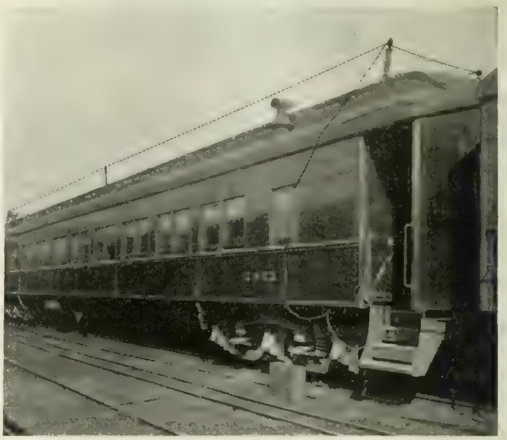
Difficulties of Reception

When first considering the project of putting receiving apparatus on a train it was found that the difficulties are greater than appears on the surface. It is necessary to put the antenna, which ordinarily should stand in the air, a considerable distance from any object, especially a conductor, within fifteen or eighteen inches from the steel of the car as it cannot be raised higher on account of the overhead obstructions, such as bridges etc. No matter how tightly the wire of the aerial is drawn it will sway and move with respect to the ground as the train travels at any rate of speed. This causes a constant change in capacity between the antenna and the ground. The lead-in wire cannot be removed more than one or two inches from some parts of the steel of the car and the car is naturally all grounded, thus bringing the antenna in close proximity to the ground. The ground wire is soldered firmly to the trucks of the coach, which makes a fairly good ground while the train is standing still but as soon as the train is started an oil film forms between the journal and the axle of the car, causing a high resistance between the trucks and the ground. When operating an ordinary stationary receiving set great care is taken not to jar the set or have any part of it moved, for mechanical motion in the set causes very audible noises in the receivers or loud speaker. It will be easily seen what will happen on a moving train when the instruments are continually in mechanical vibration. Then there are the deafening train noises to overcome as the output must be loud enough to be heard above all other competing noises. This will give some idea of the difficulties to be confronted when attempting to make radio receiving a success on moving trains.

First Tests on a Wooden Car

Tests were first carried on in one of the company's few wooden cars still in service, with considerable success. These cars offer much better opportunity for proper insulating of the antenna and lead in wire, and naturally better results were obtained than could be obtained in a steel car. Realizing, however, that it would eventually be necessary to overcome the difficulties which a steel car offers, if the apparatus were to be of any use whatever, the experiments were started in a steel car.

On Wednesday, July 26, 1922 a temporary antenna was constructed inside a coach, in order to experiment with an inside antenna. Arrangements were made with broadcasting station C.F.C.A. for special broadcastings during the test. The train was scheduled to leave Toronto for Ottawa at 12.07 p.m. At 11.50 a.m. the apparatus, consisting of two stages of radio frequency amplification and a power amplifier connected to the loud speaker, was connected to the inside antenna. Station C.F.C.A. broadcasting market reports was picked up and could be heard throughout the car and on the station platform outside of the car while the train was standing. The first test broadcasted started about 12.05. It was heard quite clearly while standing but became fainter when the train started moving. The sound then seemed to come in waves of loud and soft tones which was due probably to the swinging of the inside antenna as the train moved. The first test ended at 12.20. Toward the end of the experiment the sound became fainter and more indistinct as the distance between the train and the broadcasting station increased. The second test which was scheduled for 1.00 p.m. could not be picked up. After trying again to pick up market reports which were broadcasted at 1.30 and being unable to locate them the broadcasting station was wired to cancel further tests until the return trip. This experiment apparently showed that an inside aerial was not successful.



Installation of Aerial on Car

Signals Received at 110 Miles

At Yarker, a point about half way between Toronto and

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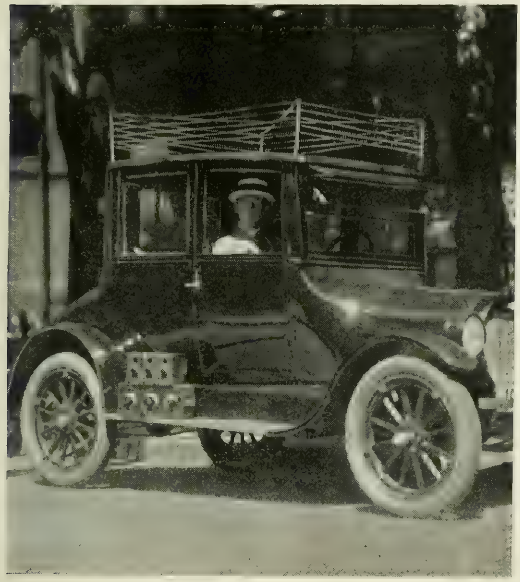
*Can. [illegible] National Telegraphs

Ottawa, the party transfered to a train returning to Toronto. A different set and a different antenna were used on the return journey. The antenna was of temporary construction, consisting of one wire along each side of the car, about 18 inches above the roof. The set contained one stage of radio frequency amplification, two stages audio frequency amplification and a power amplifier connected to the loud speaker.

Near Trenton, 110 miles from Toronto, the first indication of a carrier wave was received, which shortly after tuned in to a concert being broadcasted by station C.F.C.A. at Toronto. This was at first only audible in the head phones. At Cobourg, 70 miles from C.F.C.A., the loud speaker was connected and the concert could be heard in the vicinity of the set. The volume gradually grew louder as the distance decreased. When the train reached Oshawa, 34 miles from the broadcasting station, the reception could be heard loudly and distinctly for four or five seats around the instrument. As the train drew nearer Toronto the radius at which the broadcasting could be heard increased. Dur-this trip touch was kept with the sending station by telegraph at the stations along the way and answers were received by radio. The passenbers in the rest of the train crowded into the test car and showed keen interest. Besides announcements and music, several spark stations were picked up, and code messages received very distinctly.



An automobile adaptation—set inside when in use

On various other tests interesting results were recorded. When leaving Ottawa a small broadcasting station was heard quite plainly for a distance of 30 or 40 miles, broadcasting music from a phonograph. A concert broadcasted at Buffalo was heard clearly as the train steamed into Toronto.

Reception Affected by Character of Country

Conditions in a rapidly moving train change so rapidly that perfect tuning is difficult. It is noticed that when travelling through a heavily wooded country the signals become very faint, and come in strong again when cleared land is reached. When near a body of water, the signal strength increases considerably, but when going over a high bridge, it dies down. They are not affected to any extent by going through a cut with high walls of rock or clay on either side of the train. Sometimes as the train goes around a curve the signal strength becomes fainter and sometimes it increases. This may be due to the position of the antenna relative to the broadcasting station.

There is one other thing which effects the proper reception of radio on trains and that is the proximity to power lines, which run along railway lines or across them. When near a power line, interfering sounds are heard distinctly in the loud speaker, sometimes so as to drown out the radio signals. Telephone or telegraph lines have little or no effect.

Experiments have been carried far enough to show that there are great possibilities in radio railroad work both in receiving and broadcasting, first as a source of entertainment for passengers by means of concerts, then for commercial purposes in sending and receiving communications and for train despatching. A specially constructed railway set will be necessary to overcome the peculiarities of train operation before dependability is reached. The secret of success may be in frequency amplification, upon which much experimental work is now in progress. When a point of reasonable perfection has been reached it will be added as a part of National Service on important trains.

The Most Powerful Radio in Europe

A new era in communication between Europe and America began on Aug. 9, 1922, according to radio engineers, when the big wireless station of the Centre Radio-electrique de Paris at Sainte Assise, France, opened officially. This plant, said to be the most powerful radio in Europe, puts America and Paris in direct touch with each other for the first time in the history of the world. Pressing a key at the French company's central control station at 79 Boulevard Haussmann, Paris, an operator flung dot and dash message 3,000 miles and more through the air to the central control of the Radio Corporation of America, as easily and quickly as one might telephone from Ottawa to Montreal. And the answer was shot back almost instantaneously.

Apparatus in Use

The transmitting station of the French plant is situated on the plains of Sainte Assise, forty kilometres southeast of Paris. The apparatus consists of two high frequency alternators of 500 kilowatts in the antenna, each driven by two direct current motors of 450 kilowatts. These groups can function together or separately, either affecting a single transmission with a power varying from 250 to 1,000 kilowatts in the antenna or affecting two simultaneous transmissions with power permitting each between 250 and 500 kilowatts in the antenna. The receiving station has been erected at Villacresnes, halfway between Paris and Sainte Assise. It consists of six receiving units supplied with the most up-to-date apparatus. Normally the messages are received directly at the Central Bureau, Paris, by means of special high-speed machinery.

Government Gives Aid

The French Government began nearly two years ago aiding in the organization of a company that would take over wireless, and on January 9, 1921, M. Deschamps, Minister of Posts, Telegraphs and Telephones, laid the first stone of the great plant that was to be at Sainte Assise. A description of its plant as drawn up by the Centre Radio-electrique Company states that its transoceanic service is to be carried on by a station capable of radiating an antenna current varying from 250 to 1,000 kilowatts, according to the range or the difficulties which the communication in question presents. There and a central office supervising the various stations and for the convenience of the public.

Handling Radio Trouble Tests

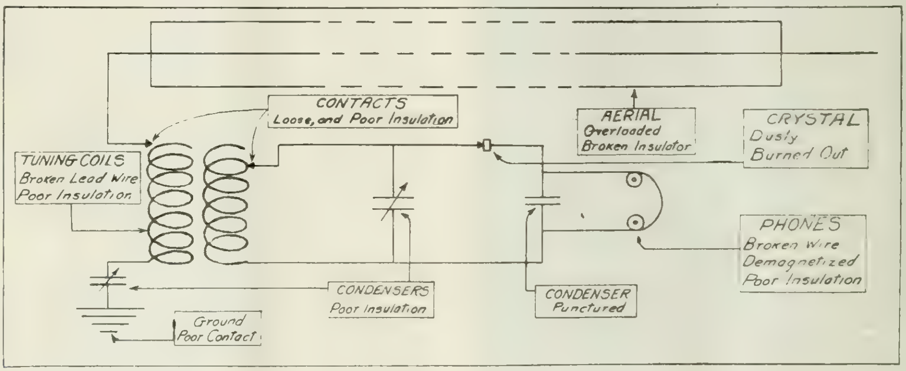
Servicing of Radio Equipment is a New Job that the Dealer Must be prepared to handle

It is an easy matter to sell a customer **once;** the hard part of a salesman's job is to sell him **well,** that is, to make him a repeater. It costs less to resell to old customers than to acquire new ones and, therefore, square dealing and service create the good-will which is the highest asset of business. This applies to radio merchandising, as much or more than anything else, and the natural corollary is that the salesman must know something about the functioning and maintenance of the apparatus he sells. The explanations that are given in this article are, accordingly, written for the salesman's point of view, with the object of enabling him to give service, and unnecessary theory has been eliminated.

Defective Sets Not Uncommon

Defective sets are not uncommonly, received in that condition from the manufacturers. Time will change that state of affairs, but the radio market is at present in such a condition that no dealer should feel justified in giving a set to a customer without at least a rough test in his shop.

In this case let us assume that the customer has bought a simple crystal set which will not function properly. The best thing to do is to go to his house and test it. A visual examination should first be made and will reveal any defects such as loose connections or defective parts. This may be set down as the first rule of procedure.



(1) Check up on the hook-up by going over it carefully. Tapping connections should reveal any broken circuit.

(2) If No. 1. shows everything in good condition, make an actual test. Hook up apparatus and tune on various wave lengths.

(3) Crystal scratches, static or very faint signals, indicate that the phones are not likely to be the cause of the trouble.

(4) If no sounds are heard in the phones, replace them with another pair. Signals then being heard, indicate that the trouble lies there.

(5) If phones are O.K. substitute another receiving set complete. No reception in this case indicates the aerial is at fault. If it happens that no other receiver is convenient, go over aerial, looking for broken insulators, bad insulation, poor ground, etc.

(6) Let us assume that so far no signals have been heard, but connections, phones and aerial appear to be in good condition. The trouble is then internal and is liable to be in the crystal. Remove it and test with another one.

(7) No results from a new crystal indicate that the coil or condenser may be defective. Test the coil by putting a single dry cell in series and taking a reading with a low reading voltmeter. If the dry cell voltage is very much cut down it indicates a break at some point. Take readings at various taps. These should be nearly equal.

(8) Test switch or slider contact by voltmeter cell test.

(9) Condensers are often very flimsy, but they should withstand a dry cell potential; try the condenser out by putting the cell in series and testing with the voltmeter.

(10) The condenser mounting may be improperly insulated. Clip one end of the dry cell circuit to the connection and touch the other end at various points.

(11) If the trouble has not been located so far, the whole circuit must be tested from point to point.

(12) Interference may be caused by a nearby power line or generator, etc.

General Pointers

The use of a low reading voltmeter is indicated in several of the above tests. In its place, a small flash lamp can be used as a circuit tester, the lamp and cells being removed from the case, and the brightness of the filament indicating relative resistance effects.

The tool kit of the radio service man should include the dry cell and voltmeter or flash lamp, a tested crystal and buzzer for testing, soldering kit, and file, screw drivers, pliers, etc.

It may happen that connections and construction of the set will be perfect and yet the reception is very poor. In such a case it is likely that the aerial values are wrong. Note at which end of the inductance contacts reception is most satisfactory. If the signals are best at minimum of inductance, the aerial is fixed at too long a wave length.

The currents flowing in a simple set are as small as .001 milliamperes and less, and small resistances have serious effects. Contacts **must** be good.

The dealer, however, who continually hears complaints about poor selectivity, poor tuning or interference should make up his mind whether the design of the apparatus is as good as it should be. Inferior design and construction makes poor results inevitable and the only remedy is to junk such apparatus.

How to Instal a Recieving Aerial

Antennae and Wave Length—Data for the Use of Dealers and Salesmen—Wave-meter and Calibration

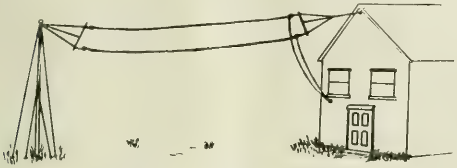
After the customer has been sold a set, it is by no means certain that he will install it properly. A few tips from the dealer will enable him to get it going with the minimum of trouble, and win for the dealer a great amount of goodwill. It is not difficult to erect a suitable aerial but mistakes can be made; the following instructions will help the salesman or dealer to advise his customers on the subject.

For receiving purposes, the antenna need be only of the very simplest kind. The higher it is erected, within reason, the better the result obtained. A single wire 100 feet long and 40 feet high is often very satisfactory.

An insulator should be placed at each end of the wire. The lead-in should be soldered on and carefully insulated from all objects that would conduct current, such as the leaves and limbs of trees. One method of installing the receiving antenna is illustrated in Fig. 1.

Fixing Antenna to Trees

The tree method seems to be a favorite one in country and suburban districts but causes considerable trouble from broken wires due to the swaying of the trees in the wind.



Where it is possible to anchor the outer end of the antenna to some fixed object like a house, barn, or pole, there will be much less breakage of antenna but where it is necessary or more desirable from the point of view of position or height to use a tree, it is well to advise customers to allow plenty of slack in the wire to allow for sway. Trees with small trunks sometimes have a sway in the upper part of 10 or 15 feet while even trees with trunks a couple of feet in diameter have a sway of 5 to 10 feet in the upper part.

Another caution that will assist in advising correct installation is to have the insulated section clear of the leaves of the tree. Allowance of several feet should be made on account of the branches blowing and for growth of the tree during the course of the summer.

When installing an aerial, point the antenna in the direction that it is desired to receive from, for the most efficient results. The end of the antenna at which the lead-in is brought in is the pointer end and should be directed at the transmitting station it is desired to listen to most regularly.

Aside from its directional qualities no definite rules have yet been determined governing the position in which an aerial must be placed. It may be straight up and down or horizontal. The only essential thing is that it shall be well insulated.

Wave Length

A knowledge of wave length is important with transmitting sets, and indeed, it is necessary to properly comply with the Government regulations. At the same time, the man who possesses only a receiving set, is interested in knowing what wave length he is receiving. These results are obtainable only with a wavemetre though there is a rough method of estimating the wave-length of an aerial, as follows:—

Add the length of the lead-in to the aerial wire length. If more than one wire is in the aerial, add one-third of length again. To this add the length of the ground wire. Take one and one half times the total.

Example: Find wave length of an aerial of three wires, 65 feet long, with lead-in 12 feet and ground 20 feet, $65+22+12+20=119$. One and one half times 119 equals 178, which is the approximate wave length of this antenna system.

The customer will feel exceedingly grateful if he wants to know something about a wavemetre and the dealer can give him the right instruction. A wavemetre may be used for a variety of purposes even with only a receiving set. It may be used to measure the wave length of an in-coming signal or to determine the distributed capacity or the ratio of coupling between primary and secondary circuits. A fairly reliable wavemetre may be constructed comparatively cheaply, though more elaborate apparatus is necessary for the determination of the wave lengths of high powered stations.

Construction of a Wavemetre

The amateur will be able to make a wavemetre which will give pretty reliable results in tuning up his sending set. Of course, for the measurements of high powered station wave lengths more complicated outfits are required. A variable condenser of 43 plates should be secured. If a case is obtained for it, and a cover with scale in degrees used, it will be much better. Also, if it is "contained" it will not only be much less liable to injury, but may be filled with pure castor oil which will increase the capacity some forty per cent. If a coil of certain inductance is shunted around this condenser and around the other side, a pair of phones in series with a galena detector, a complete wavemetre is ready. It must be calibrated from a standard one or else a curve of calibration obtained from the makers of the known inductance. For the inductance coil, a small wooden or bakelite disc 3 in. wide and ½ in. thick may be used. Cut a slot 1/16 in. wide and 1/8 in. deep around the edge. Wind about 20 turns of No. 28 double cotton-covered wire around and bring out to two binding posts. The detector may be mounted on a brass rod. In the centre the condenser binding posts are fastened. The coil is at one end and the detector and phone binding posts at the other end. Thus all connections are stationary and permanent. The capacity of the condenser should run from .0001 to .0005 mf. and be of stable construction.

How to Calibrate

If the amateur can get the loan of a standard wavemetre, he may calibrate his own quite readily by using a buzzer. The buzzer excites an oscillation current, and by means of inductive coupling the other condenser may be calibrated and marked on the scale for corresponding wave lengths.

There are more than 200 broadcasting radio stations in Canada, and the United States.

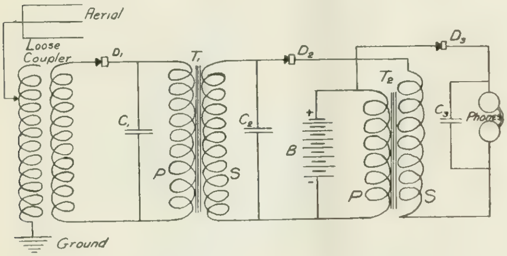
Signals May be Amplified with Crystal Outfit

Improvements and novelties are abundant in the radio field, and it requires a wideawake dealer to keep abreast of them. For instance, not long ago, most of us declared with some confidence that it was impossible to obtain amplification with a crystal hook-up—and now an amateur has announced his discovery of a method of doing that very thing.

His hook-up for the purpose comprises three galena detectors, a tuning device such as a loose coupler, two audio frequency amplifying transformers, three fixed condensers, a high voltage or B battery and telephone receivers. A schematic diagram in given in Fig. 1. The battery was necessary to furnish currents to help the weak incoming radio signals push their way through the amplifying transformers and detectors. It is said that any form of tuning inductance may be used, but better results will be obtained with a loose coupler, as it will permit closer tuning, an important factor.

The most sensitive crystals are employed, galena being preferable. However, if a very sensitive srystal is used in the first detector, it will be found that the amplifying detectors will not require ones so sensitive. Crystals are tested in the usual way, by a buzzer.

In adjusting the detectors, the cat whiskers of the amplifying detectors should rest on their respective crystals. Then the first detector (D1 in diagram) is adjusted by means of the buzzer method. The adjustment of this detector is very important and should be made carefully. The second detector must not be carried to the primary of the second transformer, but must go to the secondary. If this is not done, it will be found that the signals will not carry through the second transformer.



In the diagram, D1, D2, and D3 are galena detectors. C1, C2, and C3 represent fixed condensers of 0.001 microfarad capacity. T1, and T2 are both ordinary audio frequency ampifying transformers of the type found in tube sets. Their primaries are indicated by P and secondaries by S. B is a 22½-volt battery, connected as shown. This may be increased with somewhat better results. The best voltage must be determined by experiment.

The inventor has not yet determined whether it is possible to use a loud speaker, though he claims, that the usual range of the outfit is considerably increased.

Battleship Steered by Wireless

The obsolute battleship Agamemnon was recently used in the English Channel as a target for bomb practice from the air. Without a living soul aboard, she was controlled and steered by wireless from a destroyer which was miles away. Steaming at ten miles an hour and changing her course from time to time in answer to the wireless direction, the Agamemnon was handled by wireless alone through a series of manoeuvres.

Commercial Radio Left to Companies

It is said that the policy of the Canadian Government is to get out of the commercial end of wireless telegraphy, to which it was to some extent committed as a war exigency. It will, of course, maintain such wireless installations as are an aid to navigation.

One of the largest wireless stations in Canada, that at Barrington Passage, N. S., will be closed in the near future. This follows on similar action taken by the British Government with regard to the Admiralty medium power radio station at Bermuda, which was closed on July 1. As a consequence, the commercial service between Barrington and Bermuda has been suspended, and, as the Government has no other use for Barrington, it will be closed. Both were war stations, having been erected in 1915 as part of the chain of naval radio stations extending from St. John's, Nfld., to Demerara, British Guiana, Barrington acting as the connecting link between St. John's and Bermuda.

The closing of Bermuda and Barrington marks the termination of the North Atlantic chain of naval radio stations, St. John's, Jamaica and Demerara having been closed by the Admiralty in June. The three radio direction finding stations at Cape Race, Canso and Halifax, erected during the war, will be retained as a permanent part of the "aid to navigation" service of the Department of Marine and Fisheries.

The Power of Service

He drove into a small gasoline filling station where automobile accessories are sold. The fellow in the car on the other side of the gas pump was one of those eventempered individuals—mad all the time. "What do you ask for these new-fangled lenses the law says we must use?" he grunted.

"Four dollars," answered the gas man. "You need a little more air in that left rear tire. Don't get out, I'll attend to it."

"Your price is too high. I can get them for three and a quarter."

"Zat so? I see you don't need any oil." He lowered the hood as he spoke and carefully wiped off a grease spot.

"You fellows are robbers. I'll give you three and a quarter and not another cent."

"You need at least a half-gallon more water," remarked the gas man as he reached for the can. "You're going to spoil a mighty good car some day if you aren't more careful."

"Will you put 'em in for three and a half?"

"Can't do it. By the way has the rim squeaked any more since I tightened up those lugs "

"Dammit. Put 'em in. You render me so much service I can't afford not to deal with you."

Doesn't the moral of this little incident shine out like a house afire on a dark night?—The Buzz Saw.

The question of most vital interest, however, is whether or not the period of greatest stress is behind us. A decreasing total of failures in the United States during the successive months of the present year would seem to indicate a definite improvement in conditions. Canadian figures disclose a similar situation, in spite of the extremely high business mortality rate during the first half of the year. The record of solvency during the second quarter is an improvement over that of the first quarter.—Royal Bank of Canada.

Radio Window Display Must First Attract Attention

The Prospect Comes in and Buys After the Window has Caught His Notice—Suggested Displays

One of the most important helps to selling radio equipment is the intelligent use of the show window, says a writer in the National Electragist. In displaying radio, there must be a middle ground and some old established rules must be either broken or modified to suit new conditions. There are radio buyers in both the wealthy and the poorer classes. The appeal must be made to reach both classes . It would be a poor policy to display a single piece of the more expensive equipment in a window all by itself surrounded only by an artistic background and velvet draperies.

On the other hand the display of hundreds or thousands of small binding posts, condensers, coils or wire, insulators and other miscellaneous equipment hardly fills the bill There seems to be much that can be done in the matter of displaying radio goods. Here are some suggested layouts for windows:

A Variegated Display

Section 1—At the centre of the window show two or or three radio telephone receiving sets of different sizes and types starting with a simple crystal set, an audion detector set, a regenerative set and a two or three stage amplifier set. As there are new recruits being constantly added to the army of radio fans, it is necessary to go further than merely displaying these sets. Each set should have a neat placard under it stating its use, its approximate range in miles and wave lengths and its price.

Section 2—Right of the window. This does not need to be separated from the central section but may be as desired. Several types of antenna equipment could be shown with the coil of wire, insulators, lightning arrester, tube, lead in wire and everything necessary. It would be well to label each article and have each group placarded neatly with the price and any information available about the style of set it is supposed to go with. Headpieces could also be displayed with this section, each labeled with trade name, the resistance in ohms and the price. Some of the more elaborate antenna equipment such as coil antennae, loading coils, etc., could also be shown to advantage.

Section 3—At the left of the window two or three groups of equipment for "making your own" could be shown. These groups could be placarded: "This is the equipment you need to make a crystal receiving set, $19.75"—or something like that. And so on with two or three other sets showing the actual wire, binding posts, condensers, tubes or whatever is necessary to the amateur to complete the making of the set.

This seems to be almost the primary kind of a display and there is no limit to the elaborations that can be made If sufficient windows are available there is no reason why each of these sections cannot be expanded into a window by itself. It would seem to be much more logical to display goods this way than to throw a lot of stock into the window and let it go at that, and yet this is too often done.

Using Ribbons

The back of the window is covered with white paper on which is drawn a conventional house with a radio receiving set. An artist could sketch this up attractively and so arrange it that the antenna receiving set, ground, headpieces, etc., are all shown. Those parts which do not show on the outside of the house can be shown through a window or the house can be shown with the walls broken away to show the desired parts. Very small ribbons of different colors are pinned to the different parts and the other ends of the ribbons brought down to the floor of the window to the actual parts. For instance a red ribbon would be tacked to the sketch of the antenna wire and the other end of the ribbon would lead to a coil of real antenna wire. A blue ribbon would be tacked to the receiving set and the other end of the ribbon would lead to the real set in the window. And so on with all parts such as lightning arrester, ground clamp, porcelain tube for lead in, lead in wire, ground wire, etc. A window such as this can be made very attractive, and if the window is a large one the sketch can form a permanent part of the display, auxiliary displays being changed from time to time. It is also possible to vary the scheme by having a sketch or a large blueprint of a receiver and ribbons—from the drawing leading to parts necessary to make the set.

For More Expensive Sets

Where the prospective customers are able to afford the more expensive things in radio, an attractive window can be worked up by showing several of the more elaborate sets, sets contained in consoles, in table lamps, elaborate loud speakers, and so on. For a class of customers like this, much of the cheaper goods can be elimiated from the window although even the wealthy have sons who like to fuss around making things for themselves. If the store happens to be in a wealthy neighborhood, remember that there are many of the younger generation who are on allowances that make it necessary to look out for the pennies.

Clifden Wireless Station Damaged

Louisburg wireless station has recently been working direct with London instead of its accustomed trans-Atlantic corresponding station, Clifden, Ireland. The messages from Clifden suddenly ceased, and shortly afterwards came instructions to work with London. This caused no inconvenience to Cape Breton, which is so powerfully equipped that a few hundred miles more or less means nothing, but the London station is not a trans-Atlantic station and its power plant was exerted to the utmost to carry on the additional service.

Reports received by the Marconi company from Galway indicate that the damage done to the Clifden radio station on the coast of Galway, which was set on fire by the Irish irregulars, was not as serious as at first supposed. The Marconi officials say they hope to re-establish direct communication with Glace Bay within twenty-four hours. Meantime messages for Canada are being sent from the new sattion at Ongar, in Essex.

The main building, most of the machinery and the condenser house at the Clifden station are virtually intact, but many of the overhead and underground wires which fed the station were destroyed.

"There may be a time when power to turn the wheels of industry will be furnished by radio. In some respects, radio power transmission exists to-day, for the message you receive by radio has been carried by the power of electromagnetic waves from the sending to the receiving station. Successful work is now done in directing radio waves, as for instance, our trans-Atlantic stations send out most of their power eastward."—Dr. Charles Steinmetz, at International Radio Congress.

BETTER MERCHANDISING

It's an Ill Wind that Blows Nobody Good

The coal shortage, due to the strike of the U.S. miners, has created a very serious situation for the general public.

The only alternative source of heat, in many localities, is electricity. Of this there is not enough to go round, of course, but, as an auxiliary, it can go a long way toward relieving the situation.

In many sections of the Dominion there is a surplus: for instance, in that section of Ontario served by Niagara Falls. Queenston has three fifty-five thousand horse-power units already installed; the early fall will see a fourth and the New Year a fifth generator in action—a total of 275,000 horse-power. For the sake of argument let us suppose that half of this could be spared for heating purposes to supplement our limited coal supply,—i.e., 137,500 horse-power or 103,000 kilowatts. Allowing for the diversity factor it would doubtless be quite safe to connect a heating load of 150,000 kilowatts.

This looks like a fine opportunity for the manufacturers and dealers. The average heater has a capacity of perhaps 1,000 watts; most of them are less; comparatively few are greater than 1,500 watts. Therefore there is "juice" to operate 150,000 heaters. And this applies to the Niagara district alone.

Here, then, is a job for the Electrical Industry during the next two months. Wherever the pinch of the coal shortage is felt, if there is a surplus of electric energy, don't delay a moment.

Isn't it a great opportunity?—**Start today.**

Convention of Contractors and Dealers, November 13 and 14

The convention of electrical contractors and dealers which is being arranged for Toronto, on November 13th and 14th., under the "auspices" of the Ontario Contractors and Dealers' Association is already giving promise of bumper results. Mr. Charlie Hopper, chairman of the General Convention Committee is a thorough enthusiast himself and also has the faculty of gaining the hearty co-operation of his co-workers. The various committees are already hard at work.

While this convention, having its meeting place in Toronto, will naturally draw its largest clientele from the province of Ontario, it is the hope of the committee that delegates will be in attendance from every city and town of prominence in Canada, so that it will, in affect, take on the nature and authority of a Dominion convention. Most of the discussions likely to arise will be of such a nature that the experience and advice of contractors and dealers from all over the Dominion will be eagerly sought and exceedingly valuable in reaching decisions.

The Committee hopes that every city and town in Canada will take immediate steps to have representation at this convention. If you cannot come 'En Masse' send one or more delegates—but no town, however small, should fail to have one representative.

Lay your plans early and remember the dates—Nov. 13th. and 14th.

Telephones Silent in Honor of Dr. A. G. Bell

For a period of one minute on Aug. 4, there was no ringing from any of the telephones in homes or places of business over the two provinces of Ontario and Quebec; nor was there any response to lifted receivers. This stoppage was a reminder of the monumental work effected in the life of Dr. Alexander Graham Bell. Even the brevity of the pause emphasized the integral and essential part Dr. Bell's invention continues to play in the life of the world.

In Brantford, Ont., the Bell memorial was decorated with wreaths in memory of one of the city's greatest men.

Dr. Bell was born in Edinburgh, Scotland, on March 3, 1847. He was educated at Edinburgh and London, and held honorary degrees from several British, Continental, and American universities.

He invented the telephone, for which the first patent was granted on March 17, 1876. He also invented the photophone, the induction balance and the telephone probe for painless detection of bullets in the human body.

In recognition of his inventions he was awarded many decorations, and among other honors was created an officer of the French Legion of Honor.

100 Per Cent.

As a result of the visit of Mr. K. A. McIntyre and L. W. Davis to the cities of Port Arthur and Fort William the following contractors and dealers have been elected to memberships in the Ontario Association of Electrical Contractors and Dealers;—

A. C. Waltz & Company,	Port Arthur,
Mahon Electric Co. Limited	Fort William,
Fort William Electric Co.,	Fort William,
Electric Sales & Engineering Company	Fort William,
Howard E. Phipps,	Fort William,
Lakehead Engineering Co.,	Port Arthur,

We understand that this represents a 100 per cent. membership.

The Diamond State Fibre Company of Canada, Ltd., expect to have an interesting display of Condensite Celoron, in addition to their usual show of Diamond Fibre, at the Canadian National Exhibition. This display will be housed in Booth 89-A in the Industrial Building.

To Remove Oil or Grease Spots from Carpets

It is probable your customers frequently ask you for a practical and efficient method of removing oil and grease spots from floor coverings or perhaps the rugs or carpets in one of your departments are oil spotted. There are undoubtedly several methods used, all indifferently effective, but here is one that is simple, easy and is claimed to be efficient and will in no way fade nor injure the rugs. It has been developed and tested in the research laboratories of the Hoover Suction Sweeper Co. at North Canton, Ohio. These laboratories are devoted exclusively to the investigation of better cleaning methods and they have thoroughly proven the worth of this means of grease-spot removal:

Rub talcum powder or French chalk into the spot thoroughly. Then remove this powder with the Hoover electric cleaner. Repeating this operation several times will completely remove the spot. In the event that this should fail to take out the spot, it is due to the fact that the grease is too hard. This can be remedied by ironing with a hot iron after first, of course, dusting with the powder. This will melt the grease and allow it to be absorbed by the powder. Then all can be taken up with the cleaner.

I. E. S. Annual Convention

The Illuminating Engineering Society will hold its 16th Annual convention in Swampscott, Mass., on September 25th to 28th. The following topics will be discussed: Residence Lighting Practice in the United States; Wiring and Lighting in the Middle Class Home; How to Tell Period Styles in Fixtures; Overcoming Daylight Reflections in Show Windows; Effect of Light on the Drawing Power of the Show Window; Illumination of Cafes and Restaurants; Lighting the Food Industries; Performance of the Tungsten Filament Lamps on Alternating and Direct Current; Practical Application of the Principles of School Lighting; Office Lighting from the Viewpoint of Hygiene; The Cost of Daylight; Motion Picture Studio Lighting; Screen Brightnesses for Motion Pictures, etc.

Messrs. Cochrane, Stephenson & Co. Ltd., have been appointed Western Representaives for the Square D Company.

Mrs. Byer Is Disgusted with Unbusiness-like Contracting Methods

An Open Letter That Exposes the Errors Some Contractors Fall Into

Editor, Electrical News,

You may think that I have mistaken your periodical for a Ladies Home Journal, but I assure that is not so.

I believe that now we women have won the right to vote and to be voted upon, to be M.L.A's and M.P's, and to do our cleaning, washing, ironing and cooking by electricity, we should be entitled to have our letters printed in the "Electrical News," and I am sure, Mr. Editor, if it will not pass on its own merits your chivalry will prompt you to print it.

By way of introduction, and partly to explain to you my reason for writing a letter to an electrical trade paper, I will say that although my name is Ida A. M. Byer, my husband calls me instead I-do, and I am the buyer of various electrical appliances for our home, which now and again brings me in contact with your electrical contractor-dealers, as they call themselves but, most important of all the reasons is the fact that my best chum, my sister, is married to an electrical contractor-dealer.

Not wishing to cause any trouble in my sister's household, I'll just say that we live in Canada and that my brother-in-law's name is Ben Socket; my husband is a plumber who started in business on his own at practically the same time as Ben Socket did.

My sister being my best chum, I am naturally aware of all their pleasures—which are mighty few—and troubles personally and in business—which are many. My husband Jim and I frequently used to wonder why it was that although Jim worked a great deal less hard and shorter hours than Ben did we were considerably better off, had less financial business worry and enjoyed the leisure hours running about in our own motor car whereas the Sockets are still patronizing street cars, when they do not walk.

Then I began listening to the conversations between Ben and my husband, and have come to the conclusion that Ben's troubles are not only his own but probably also those of most men engaged in the same business as he is.

Ben knows where the shoe pinches

What I, as a women, dislike most in Ben's attitude is that he knows where the shoe pinches, knows what is wrong and how it could be at least partly rectified (and I am sure others like him know also) but all he does is to complain, find good excuses and reasons for conditions not being as they should be, doing nothing to improve his lot—although most of the means for improving these conditions are in his own hands.

For the last year and a half Ben has hardly made a living out of his business, and my poor sister has an awful time trying to make both ends meet, although they are living as modestly as one may. You may readily understand, Mr. Editor, how disheartening this is for me, seeing my sister and Ben working hard, striving to accomplish something worth while for nearly twelve years and instead of progressing finding themselves worse off as time goes on.

My husband, when listening to Ben's complaints of business conditions in the electrical trade, often loses patience and tells him that he has a wrong name, that he should change it (and all other electrical contractor-dealers should change theirs) to what he believes my brother-in-law should be called instead of Socket; then, perhaps out of shame, they would take the bull by the horns to make the electrical contractor-dealers' business at least as profitable and respectable as the plumbers' is today.

Jim tells me that in the building of an average home the plumber gets 8.7% of it's value, and that the electrician and the hod carrier each get about 2.6%; in the construction of a brick house, the hod carrier gets 6.7% against the electrician's 2.6%.

But, you may ask, why is Mrs. Byer writing all this to me? Why does she want me to print it in the Electrical News?

I pray of you, Mr. Editor, to print it in hopes that electrical contractor-dealers, or their wives, if the men will not, will write to you also telling what is wrong and how to find a remedy, for surely there is a remedy for everything. I feel I must do something to help my sister and this can be done only by making Ben Socket a two-way useful electrician: a good tradesman and a good business man.

"I began listening to their conversations"

Now I shall give you an outline of some of the conversations that frequently go on between my husband and my brother-in-law, which will bring out some of the sore points in his trade:

The other day Ben told my husband of another electrical contractor-dealer, named Plug, who had done some work for Charlie So-Long, a Chinese laundryman, in whose place of business for a considerable time there was one light outlet in the center of the ceiling from which a number of flexible cords provided six or seven lights around the place. Charlie, of course, was hardly to be blamed for it, as the work was done by an "electrician" and as nobody saw to it that Charlie provides a proper and safe lighting installation in his laundry, he was squirting water on shirts and collars year after year by the light of some 700 watts fed from one circuit via flexible cords running all around the walls. Recently a relative of the Fire Brigade Chief brought some silk shirts to Charlie

So-Long to be washed and, as he realized that his shirts are safe with So-Long only so long as there is no short circuit in the wonderful electrical installation in Charlie's establishment, he used the influence of his relative to put some fear into Mr. Chinaman's heart to have a safe lighting installation, which the uniform of the obliging fire Chief succeeded in accomplishing.

The opportunity to get this work was given to Plug by Wringer, an electrical appliance dealer, who, some time previously, had sold to Charlie a washing machine. Wringer, who sold Chinamen a considerable number of washing and ironing machines, always at a reasonable profit, of course, because he was a real dealer and knew how to handle business and customers, warned Plug, on the strength of his past experience, to charge Charlie a reasonable price, and stay with whatever price he may ask.

"No Payee, No Washee"

So-Long, like all other "Charlies," got prices from several electrical contractors, although all "Charlies" charge identically the same price for washing the laundry and it is just a waste of time to argue lower price with them, their maxim being:—no payee, no washee. When Plug went to Charlie to tell him he would start the job the next morning, Charlie asked very phlegmatically: "Hamush?" "Twenty four dollars, Charlie, for six light outlets anl I'll give you a first class job for that money," was Plug's answer.

So-Long grinned slyly and without any haste pulled out of his pocket a few business cards of electrical contractors and, showing one to Plug, said with a grin: "he makee fils class job sixteen dollal." Plug did not even take time to figure out if, taking the job for that price, he will cover the cost of material, labor and overhead, but just said, "all right Charlie, by golly, I'll do it for the same money."

He did not reflect for a minute how much better off he would be refusing altogether Charlie's offer, instead of accepting work at a figure that did not allow him any profit—for the sake of which he was in business and to which he was justly entitled—but was actually giving to Charlie out of his pocket part of his overhead expense, as he has since discovered when going over the figures of the job at Charlie's price. All Plug saw at the moment was a bunch of his fellow contractors trying to beat him out of a small job calculated on a basis of reasonable prices and profit. He forgot Wringer's advice and his previous plans of giving Charlie such a fine job at such a reasonable price that he will be able to get perhaps thirty or forty other Chinese laundries provided with proper lighting system, which Wringer had said could be done if he only handled the sales of his trade in proper manner.

My husband interrupted Ben with an angry, "the darn fool. You fellows certainly should be prohibited from being in business. You should be working in abattoirs, cutting throats, that's your specialty; why, your friend Plug would have been better off if he had stayed home rocking in a chair, instead of letting the Chink beat him down on his price; he killed all the Chinese work in this city for all you electrical contractors, setting that low price as a standard."

I saw on Ben's face that he was quite sick of it himself, and also that this system was one of the reasons why he was not succeeding in business.

Plug Does a Little Plumbing

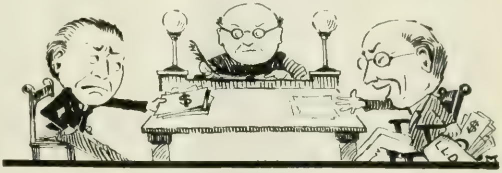
"This is not the whole story yet," said Ben, somewhat ashamedly. "When Plug finished his job, Charlie asked him if he would shift his sink, which Plug agreed to do, hoping to make up at least a part of his lost overhead and profit on the work of his own trade.

"Charlie's neighbor is a grocer, whose brother is a plumber, and he happened to be in the laundry when Plug was moving the sink, for which he charged Charlie $3.75.

"The grocer informed his plumber brother that Plug is beating him out of a job, and poor Plug was summoned before a Recorder: for doing plumber's work and fined twenty five dollars; the magistrate's remark was that the sanitary conditions of the community are of too great importance to permit incompetent and non-licensed men to do it.

The joke of it is that the grocer's plumber-brother is doing, every day in the week, all kinds of electrical work, beating the electrical contractors of their legitimate business, but nothing can be done to stop him.

Plug said that when the magistrate fined him his brains moved faster than a moving picture on a screen: he saw first himself sitting in his office figuring out the cost, profit and price for Charlie's job, the fair profit on that particular job multiplied by forty (because Wringer told him that he easily could get that many Chinese laundries attended to if he went after the business in a proper way); then he saw himself already installing electric fans and pilot lights for irons in the same laundries; then the magistrate telling him to pay twenty five dollars and, finally, Charlie accompanied by forty other Chinamen asking him: "you makee tventy fol dollas job fol sisteen? good businessman, mistel Pulg."



"Plug was fined $25.00"

The magistrate would not even listen to Plug's statement that he get's no protection, that butchers, coblers, plumbers and carpenters are doing electrical contractors work, that there is more danger to life and property from electrical work being done by incompetent men than from moving a sink; all the advice he got was: "find out how the plumbers have done it."

Ben has admitted to my husband that Plug's case as far as taking jobs at a customer's figure, even if it is at a loss, is quite a common case among electrical-contractors, and that this practice virtually establishes the low standard of payment for electrical work.

He also stated that most of them are doing it because they do not know how to properly figure out their own cost and because they have to meet competition of electrical contractors who have neither business premises to keep up, stock, nor a pay roll to meet and are doing contracting work on a basis of what they can make per day working as journeymen and contractors at the same time.

His face somewhat brightened when he said that this is going to stop soon, because they are forming an organization of the electrical contractor-dealers to protect their business, which should help in setting the house in order.

It would take many pages to report all the conversations of my husband and Socket, so I will write you again once in awhile, giving in each letter a different story of Ben's troubles as he tells them to my husband.

If any of the contractors, or their wives would care to communicate with me, they could do so by writing to you, Mr. Editor, and I hope that you would be good enough to send their letters along.

Youre very truly,
Mrs. I. M. A. Byer.

The Conversion of the Architect

To Better Wiring—A Successful Venture by the Electrical Co-operative Assn., Province of Quebec

The Electrical Co-operative Association, Province of Quebec, is continuing it's campaign for closer co-operation with the architects by sending to all of them a letter (printed below), accompanied by a suggested plan of a properly wired, medium-sized house, with standard electrical symbols.

All the electrical contractor-dealers in the Province of Quebec are also sent copies of this letter along with one addressed to them directly. The statement recommended to the contractor-dealers to be carefully read and used as an argument when selling proper wiring of a house is as follows:

Read Carefully—This was Printed in Both Languages on Reverse Side of House Plans

"Electricity is constantly making life easier, more convenient and more comfortable for everybody, and, soon, houses not thoroughly equipped for every phase of electrical service will be an exception.

"Considering the importance of the electrical equipment of the home nothing should be omitted to have the wiring right, the illumination properly provided for, convenience outlets "conveniently" placed and the materials and appliances should be what the experts have decided is nesessary for a safe, dependable and permanent work.

"The man who knows electricity, so far as it applies to the modern household, is the qualified electrical contractor, who is in close touch with the latest developments in the electrical field, who employs good workmanship, uses standard material and charges fair prices.

"Cut-rate, irresponsible electrical contracting service is always expensive and frequently disastrous.

"One seldom saves more than one-half of one per cent ($50.00 on a $10.000 house), and is likely to spend five times that amount in replacing poor workmanship and substandard materials and in supplying the needed "convenience outlets" and wall switches whose omission made the bid possible.

"The economy of the lowest bid exacts heavy penalties in electrical contracting work.

"The plumbing of a house generally costs about 13% of the total cost; a fair basis for judging the quality and completeness of the electrical wiring, excluding fixtures, of the home has been set at 5%.

"The home one builds today is expected to remain modern for ten or fifteen years; with the progress that is being made today in electrical equipment of a home, nothing but the latest and most complete features will be economical.

"Give your work to a thoroughly reliable electrical contractor, demand completeness and quality rather than cheapness of work."

Letter to Architects

"This Association is soliciting your kind assistance in adopting a uniform standard of electrical symbols in preparing building plans.

"The enclosed printed sheet of symbols, giving their names in both the English and French languages, was adopted by this Association as well as by the Electrical Contractor-Dealers Association, Province of Quebec, Incorporated, as a standard.

"It covers the designation of all the possible electrical requirements in buildings of all kinds.

"We believe that its adoption will facilitate the work of the architects, engineers and electrical contractors.

"Additional copies will gladly be supplied to you free of charge whenever you may require any; we are sending them also to all the electrical contractors to enable them to follow the plans.

"You will also find attached a suggestive plan for a properly wired medium sized house, of which we hope you may make use.

"Our aim is to have our Province a place of well lighted homes with the manual domestic work made as easy, convenient and economical as it can be accomplished by having the house properly wired for use of electric light, heat and power.

"We are anxious to have in our work the co-operation of the architects of our province, which we bespeak herewith.

"Your acknowledgment of receipt of this letter, criticism and suggestions will be greatly appreciated."

Accompanying Letter to Contractor-Dealers

"Enclosed, you will find copy of a letter sent to all the architects of the Province of Quebec with a request to use the standard electrical symbols as per enclosed printed sheet.

"The letter to the architects will explain to you the reason and purpose of it.

"We would ask you to assist the association in this work by requesting, whenever an opportunity presents itself, the architects with whom you may be doing business to make a practice of using the standard symbols in preparing their plans.

"We are anxious to develop closer co-operation between the architects and the electrical industry in which you can do your part through personal contact with them; it will eventually mean many welcome dollars in your own business.

"You will also find enclosed copy of a suggestive plan for proper wiring of a medium sized house.

"Please, use it as a minimum standard for wiring houses of that size, read and read carefully the printed statement on the reverse side of that plan, using it an an argument when suggesting to your clients a proper electrical installation. It will pay you and them.

"We will be glad to supply you with copies of that plan whenever you may see an opportunity to distribute them among prospective builders.

"We are doing it for your sake and the least you can do is to assist us in this work."

Remarkable Results

This effort to make the builders of houses and the public at large realize the value, economy and convenience of a properly-wired-for-electricity house, although quite recent in the city of Montreal, is beginning to show some positive results. The Lancashire Land and Construction Company, for instance, who have built in the past close to one hundred houses **were allowing** for electrical installation a maximum of $60.00 per house. However since they became converts to this educational campaign of the Co-operative Association, they have built this year some 20 houses in which the wiring amounts to **over 200.00** dollars per house.

The 16th Annual Convention of the association of iron and steel electrical engineers will be held in Cleveland, Ohio, September 11th., to 15th., 1922.

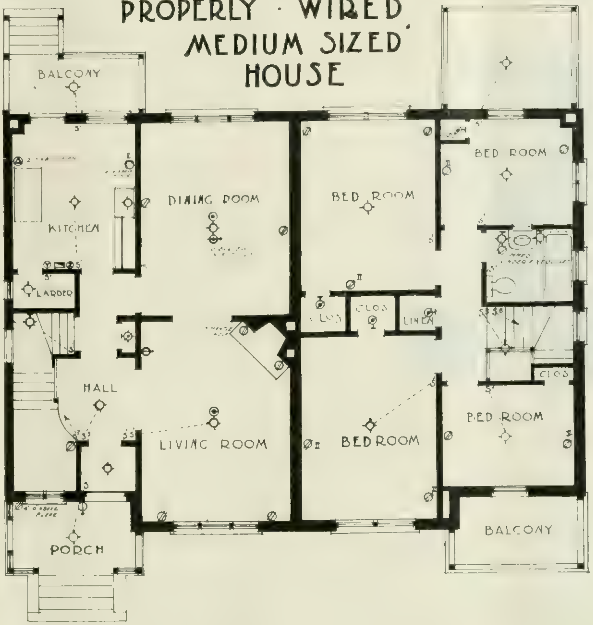
Do it Electrically
ELECTRICAL CO-OPERATIVE ASSOCIATION
PROVINCE OF QUEBEC

·ELECTRICAL·CO-OPERATIVE·ASSOCIATION·

·PROVINCE·OF·QUEBEC

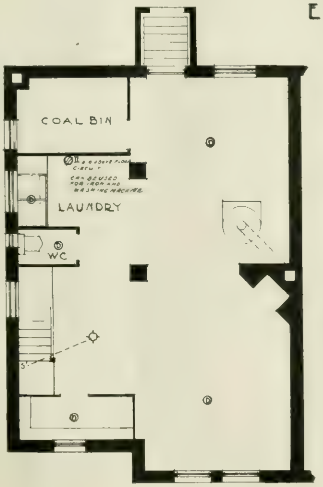
SUGGESTION FOR A PROPERLY · WIRED MEDIUM SIZED HOUSE

Faites-le à l'Electricité
L'ASSOCIATION·COOPERATIVE·ELECTRIQUE
PROVINCE DE QUEBEC



GROUND FLOOR PLAN

FIRST FLOOR PLAN



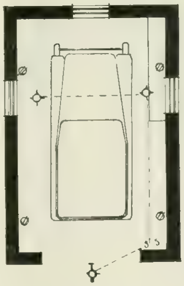
BASEMENT PLAN

ELECTRICAL SYMBOLS

- ⌖ CEILING FIXTURE
- ◎ DROP CORD
- ⌖ WALL FIXTURE
- ⌖ WALL PULL CHAIN LAMP SOCKET
- ◉ FLOOR PLUG
- ⊕ BELL TRANSF OUTLET
- ● ELECTRIC RANGE OUTLET
- ⌀ BASE PLUG RECEPTACLE
- II DUPLEX RECEPTACLE
- S¹ WALL SWITCH SP
- S³ " " 3WAY

LOW TENSION

- ▬ ANNUNCIATOR
- ⊖ WALL PUSH
- ⊕ FLOOR PUSH
- ⊗ BUZZER



GARAGE

Plan Sent to Architect by Electrical Co-operative Association, Province of Quebec

Electrical Activity in Manitoba

Mr. E. V. Caton, chief engineer for many years of the Winnipeg Hydro-electric System, has resigned to accept the position of chief engineer with the Winnipeg Electric Railway Co., replacing Mr. G. Lewis, who returns to the United States. Mr. Caton is an Englishman who came from Birmingham to install equipment for the Vickers Co. After superintending the installation of the first five units at the Point du Bois power-house, he was offered the position of chief engineer of the Winnipeg Hydro, and has held that position ever since.

Mr. E. V. Caton

Mr. Caton is chairman of the local branch of the Engineering Institute of Canada, a member of the Council of the Manitoba Professional Engineering Association, an active member of the Executive of the Manitoba Electrical Association and has written a number of articles for the trade press, including descriptions from time to time of the construction and engineering features of the Winnipeg Hydro generating and distributing plants.

Mr. R. A. Davis, of London, Ont., who represents The Consolidated Lamp & Glass Co. of Pittsburg, was a recent visitor to Winnipeg and has made arrangements whereby the Great West Electric Co. Ltd., Winnipeg, will handle his line of commercial glassware, known under the trade name of "Coralite", for Western Canada. Mr. Davis reports business as being very good in Eastern Canada.

The survey of the Winnipeg Hydro auxiliary power site at Slave Falls is making good progress. Various cross sections of the river have been taken and profiles of the power house and dam sites.

The Winnipeg Hydro are investigating the feasibility of installing wireless telephonic communication between Winnipeg and the power house situated 80 miles distant. If experiments which are being made show good results, sending and receiving sets will be installed at both ends.

Mr. Fred H. Wilson formerly with City Electrical Dept., Winnipeg, now with Chicago Fuse & Manufacturing Co., paid a two weeks visit to Winnipeg looking up his old friends.

Mr. J. Gordon Smith who has been seriously ill for the past four months is now able to pay short daily visits to his office, the Great West Electric Co. Ltd., Winnipeg.

Mr. J. G. Glassco, Manager of the Winnipeg Hydro, has put through a recommendation to the city council suggesting that they inaugurate a Publicity Bureau for the purpose of placing before the citizens, more fully, data regarding the extension of the tramway franchise. He states that the future of the Winnipeg Hydro is so vitally connected with the disposal of the street railway system, that it is important for the citizens to have the facts from the municipal ownership point of view as well as that of the street railway company, who at present issue a Bulletin known as Public Service News.

The Winnipeg Electric Railway Company has just constructed a half mile double track street car extension on Academy Road. This line serves a fast developing district, and as a result of the extension already many new homes have been built.

An extensive track rehabilitation programme is under way by the Winnipeg Electric Railway Company. When present work is completed the track on Main Street from Higgins to Redwood, a distance of about a mile, will have been renewed. The company is using the Dayton resilient tie in this construction.

Very rapid progress is being made by the Manitoba Power Co. in the construction of its new hydro-electric plant at Great Falls. The initial units in this 168,000 h.p. plant will be in operation by the coming Christmas

The loss on the operation of the Saskatoon's electric light and power plant during June this year was $588.73—less by over $300.00 than the loss incurred during the same month last year. Comparative statistics made public by J. R. Cowley, electrical engineer, are these:

	1922	1922
Output, kw.h.	1,132,490	979,030
Expenditure	$36,152.11	$34,264.60
Revenue	35,563.38	33,362.50
Loss	588.73	902.10

Commenting on the fact that consumption of light and power in Saskatoon is increasing, Commissioner Andrew Leslie said that no funds would be available for the construction of the many extensions recently promised by the city council until the four money by-laws, to be voted on a second time on August 1, have been approved.

Fred E. Garrett & Co., 501 Confederation Life Building, Winnipeg, Manitoba, have been appointed western representatives of the Ferguson Manufacturing Company, of London, Ont. (conduit pipe fittings.)

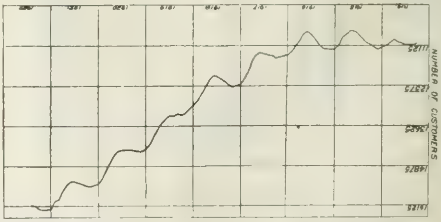


Chart Showing Increase in Customers Edmonton Light & Power Dept.

Meeting of Manitoba Electrical Association

On Thursday the 20th July, the Manitoba Electrical Association held a general meeting at the St. Charles Hotel, Winnipeg, at 6:30 p.m., the object being to receive reports from the various committees as to the programme for the ensuing year. J. E. Lowry, president of the association, after praising Morris E. Deering, retiring president, and Jim Swan, retiring secretary, for the splendid work they had done in the interests of the Manitoba Electrical Association, during the past year, stated that he felt that the association, should have local speakers at the general meeting, instead of bringing in outsiders from distant parts.
quently happens.

E. H. Smith, chairman of the Picnic Committee, suggested that during the months of August, September, and December, that the members meet only once a month, and twice a month for the remainder of the year, said meetings to last only one hour. Mr. Smith then called on Fred J. Pratt to tell those present what progress had been made in connection with the Annual Picnic of the association, Fred stated that the date of the picnic has been changed from the 3rd of August to the 15th August, on account of the Automobile Club having made arrangements to take out all the Orphans of Winnipeg on the 3rd. It is expected that the association, will take between 300 and 400 orphans to the picnic, and stated that all the members of the association, must work to put it over in as good, or better if possible, shape than last year. He also thought that the Orphan Homes should be presented with something electrical, with a name plate of the Manitoba Electrical Association on each gift.

L. B. Dickson, in the absence of Geo. Wright, who was out of the city, gave the following report on behalf of the membership committee.

It is felt by the members of the committee that membership in the Association should be of two forms, one for individuals, firms or corporations that might be termed general members, the other for those connected with firms or corporations that might be termed individual members. The general membership would be classified and the dues fixed to correspond with the ability to pay, and the benefits to be secured through the activities of the Association.

A suggested arrangement of classifications and dues, with the names of firms, corporations, and individuals that would come under these classifications, is set forth below:

1. Public Utilities.
2. Jobbers and Manufacturers Branches.
3. Local Manufacturers and Manufacturers Agents.
4. Contractor Dealers.
5. Engineers.
6. Electrical Publications.

Under No. 1	Annual Dues	$200.00
Under No. 2	Annual Dues	50.00
Under No. 3	Annual Dues	25.00
Under No. 4	Annual Dues	10.00
Under No. 5	Annual Dues	10.00
Under No. 6	Annual Dues	10.00
Under No. 7	Annual Dues	5.00
		(Individual Members)

It is suggested that voting power be in accordance with the dues paid, for instance:

Public Utilities,	with 4 in class.	160 volts
Jobbers & Mfrs.,	with 12 in class.	120 volts
Local Mfrs. & Jobbers,	with 8 in class.	40 volts
Contractor Dealers	with 15 in class.	30 volts

Individual Members would be entitled to one vote each.

On the suggested scale of dues, the estimated annual income would be as follows:

1.	4	Public Utilities	at	$200.00	$800.00
2.	12	Jobbers, etc.	at	50.00	600.00
3.	8	Local Manufact.	at	25.00	200.00
4.	15	Contractor Dealers	at	10.00	150.00
5.	3	Engineers	at	10.00	30.00
6.	1	Electrical Pub.	at	10.00	10.00
7.	100	Indiv. Members	at	5.00	500.00
					$ 2,290.00

The necessary expenditures as estimated, would be as follows:

Stenographer	$ 100.00
Notices, Postage, etc.	250.00
Entertainment—	
Picnic	
Dance	
Bonspiel	200.00
Contingencies	100.00
	$ 650.00

An amount of $1,640.00 would be available to further the objects of the Association. It is felt by the Committee that a special educational campaign might be undertaken during 1922, and that, for 1923, a well planned electrical show, with a Western Electrical Convention at Winnipeg, should be considered. It is also felt that the Association should investigate the advantages that might be derived from an Electrical Home exhibit.

For the purpose of canvassing the different classifications with the object of doing this effectively, the following canvassing committees are suggested for each:

1. Public Utilities: E. V. Caton; J. Whitsell.
2. Jobbers & Manufacturers Branches: W. H. Reynolds; G. R. Wright.
3. Local Manufacturers & Manufacturers' Agents: E. Deering; H. Farley.
4. Contractor-Dealers: L. B. Dickson; W. Sibbald.
5. Engineers: J. E. Lowry; J. Rochetti.
6. Electrical Publications: E. H. Chapman.

A suggested form of application blank was shown; the proposal is to secure payment of the dues with the application and, at the time of soliciting the general membership, that a record be taken of possible individual memberships connected therewith, for which payment should also be secured if convenient.

The committee is of the opinion that memberships from individuals, firms and corporations outside of Winnipeg and its immediate surroundings cannot be advantageously solicited until the association has demonstrated, by its activities, that it will be to their advantage to join.

L. B. Dickson
M. E. Deering
G. R. Wright. (Chairman)

Considerable discussion followed the report, some of those present feeling that the public utilities would have too strong a voting power. The question was put to a vote, and it was decided that the utilities should have twenty votes for a $200.00 membership.

Morris E. Deering then spoke on publicity, and explained the worth of editorial co-operation, which really had not been taken advantage of in the Electrical page of the Manitoba Free Press. Mr. Deering read the following letter from H. C. Howard:

A Sob Story With a Message for You

It is just about twelve months ago since the Manitoba Electrical Association gave birth to a chubby little product known as the Electrical Page. It only came into this world after the most careful investigation and research had been made. The paternal responsibility rests on Larry Cochrane.

While in the cradle this baby received the most dutiful attention from a number of foster parents. A great future was predicted for it and its acquisition to the electrical family of Winnipeg was hailed with delight and press notices from coast to coast.

When but a few months old it was forced to swallow a few "gin pills," and hair restorer medicines. Accustomed as it had been to the most delicate treatment, it almost expired despite the most careful nursing by Mr. Arthur Stundin. At this time a consultation took place and I was called in as a sort of wet nurse to give the benefit of my worldly experience.

Mr. Stundin left the city and I took charge of the baby, stripped it of its swaddling clothes, dressed it in knee breeches, cleared it of all the effects of "gin pills" and proceeded to make it what I thought a fairly respectable citizen. Within a short time it suffered from growing pains and it spread itself over two pages of the "Free Press." Its magnanimous foster parents were almost in danger of killing it with kindness and they so kindly regarded the investment that there was a suggestion made of having a bust made of Larry Cochrane so that future generations could worship at the shrine of the man who conceived this remarkable product. It gave back to its foster parents splendid returns in the way of increased sales, and wonderment was expressed that such a remarkable prodigy had been permitted to remain in the limbo of unborn ideas for such a long time.

Then, a remarkable change took place. Over night, as it were, the enthusiasm of the foster parents waned. The City Hydro, Northern Electric Company, Schumacher Gray, Bill Sibbald, the Winnipeg Electric Railway Company and one or two others alone continued giving it nourishment. As the weeks rolled by even some of these fell off, but still the nurse remained at the post and tried to make this anaemic and declining child appear to be a full-fledged, healthy and vigorous citizen. But the strategy of camouflage had finally to yield in the face of cold facts and the curtain was rung down on this unfortunate child two weeks ago and the body is now resting in the morgue.

The nurse has recovered from the grief which the demise occasioned and finds considerable consolation in looking over old files and glancing at the photographs of what once was so promising a youth.

So much for the manner in which this little child strutted across life's page. It died from lack of nourishment and natural causes. It has gone—BUT—there still remains its cradle, its clothes, its potentialities for doing good and benefitting the electrical world, which was its mission in life.

Decide for yourselves—is the page worth having? If it is, then don't you think it deserving of a little of the milk of human kindness. It can be revived. The habit of the electrical men in dodging their paternal responsibilities should certainly not apply to so delicate and frail a thing as an electrical page.

To pass to the serious side of the whole matter, don't you electrical men think you are passing up a wonderful opportunity in not supporting an electrical page. Just as an illustration let us take the Thermo heater. I venture to say that a half column story given gratis describing this heater, which appeared on the electrical page, did more to assist in marketing this article than did a number of advertisements, which must have cost well over $100.00.

There are endless opportunities for you electrical men to write newsy notes about the goods you have to sell, and by this means to attract the attention of possible buyers. You should not expect, you cannot expect, that the editor of the page is going to call on each of you each week to ask what you have to write about. If you can't realize the advantage of this page to you, and the possible sales medium there is in it, then you ought to wrap yourselves up in the cerecloth, hang the crepe and page the undertaker.

I really ought to apologize to Fred Pratt for encroaching on his preserves and referring to the Deity, but there is a great similarity between God and the electrical page—God helps those who help themselves. So does the electrical page.

There is big value in it. If you appreciate my efforts I will consider it an honor to continue to serve the association and edit the page. All you fellows have to do is to supply the nourishment in the form of advertising, and cooperate with me in making the page attractive to the readers through readable electric news items, and of benefit to yourselves by stimulating interest in the industry.

You have an opportunity here—and "Barkis is willing."

Yours optimistically for a Bigger and Better Association,

Herbert C. Howard.
Publicity Manager,
Winnipeg Electric Railway Co.

The Epitaph

Here lies the body, not yet cold
Oh gently drop that tear
Of a little child, not 2 years old
A child we cherished dear.
Twas claimed it was a welcome child
And praised both near and far
Its features were beyond compare
L. Cochrane was its "Pa."
It thrived and grew, and grew and thrived,
Twas a credit to its name
It helped out those in business
And tried to bring them fame.
But scarce ere yet it had been weaned
When so sad to relate
Its foster parents lost their love
And left it to its fate.
It struggled hard to make a show
"Twas pitiful to see
There's left but few friends now to mourn
While it lies "R. I. P."

Mr. Deering, read the following letter from K. N. Forbes, chairman of the committee of Public Relations, who was out of the city, the report was heartily approved of.

Manitoba Electrical Association
Report of Committee on Public Relations

This report can only be considered as a preliminary one, and for submission to the meeting of the Executive on Monday the 17th instant, inasmuch as one of the members, Mr. Whitsell, has been absent from the city, and the objects are such as will require considerable thought and negotiations. This report therefore, should be looked on more in the nature of a suggestion for your consideration, the following having been talked over by Mr. L. B. Dickson and the Chairman.

The Retail Merchants' Association: Inasmuch as this Association has a division classified under the heading of "Contractor dealers" whose activities are such as bring them in closer relationship with the Retail Merchants' Association, a committee of this division should communicate with the Secretary of the Retail Merchants' Association with a view to seeing how the interests of the electrical industry may best be furthered, as they naturally have certain matters in common.

Board of Trade: We believe it would be of considerable advantage to this Association if arrangements could be made through the Secretary of the Board of Trade to have two of our members appointed to their council or such committee as electrical matters could be dealt with, and through these members to enlist the support of the Board of Trade for the proposed electrical home.

Rotary, Kiwanis, Gyro and Lions Clubs, and The Canadian Credit Men's Association: An effort will be made, with your approval, to have an invitation extended to one of our members to give a talk at one luncheon meeting of each of these organizations, for the purpose of stimulating a wider spread interest in the electrical industries and the benefits to the city on account of the electrical development which is in progress at present.

Public Auditorium: Your committee purposes co-operating with the Board of Trade and any other properly authorized bodies in an effort to have a suitable public auditorium built in a central location in the city, so that Winnipeg may be possessed of a creditable building with the necessary facilities for public gatherings and exhibitions, and will endeavor to see to it that the electrical installation and equipment will be of the very latest type, and of an educational character.

Builders' Exchange: The Committee purposes approaching the Builders' Exchange in an effort to secure their co-operation in the building of the proposed electrical home.

Electrical Exhibition for 1923: While this subject may not properly come within the jurisdiction of your Committee on Public Relations, we think it would not be amiss on our part to suggest that the Publicity Committee endeavor to have an electrical show put on in the early part of 1923 in conjunction with an electrical convention which might embrace the entire west.

Remarks: It is very difficult, in the time at our disposal, to lay down any comprehensive programme along the lines suggested in your instructions, but it is the intention of your committee to take advantage of such opportunities as present themselves from time to time, with the object of further establishing our public relations and furthering the interests of the electrical industries.

Respectfully submitted,
Committee on Public Relations.

Mr. Lowry, suggested that the Association should hold a golf tournament, and very kindly offered a cup, to be known as the Presidents Cup, which offer was gladly accepted.

What Per Cent Does Your Money Earn?

Suppose a business man in whom you had perfect confidence walked into your office some morning and asked you to lend him $100. at 36%. Suppose a man to whom you owed $100. came in and said; "if you will pay me right now, I will accept $65." If your conscience did not prick you, you would jump at either offer, and if you did not have the money in your pocket or in the bank, you would make arrangements with the bank to loan you the necessary money for 6½ or 7%.

This in effect is the offer your manufacturer or jobber makes to you with every account he renders on a basis of 2%, 10 days, net 30 days. If you accept his offer you are making 36% on your money. If you do not accept his offer you are doing what is equivalent to paying 36% yourself in the meantime.

It is a rather remarkable fact that a very large number of contractors and dealers do not take advantage of this splendid opportunity to make their money work for them. It is poor business to neglect these discounts, and excellent business to take advantage of them. As a matter of fact the rate offered is so high that certain manufacturers are considering the advisability of reducing the 2% to 1%, which would be still equivalent to allowing a discount of 18%.

Just consider for a moment what this may mean in a year. Suppose a contractor were doing business in a small way and his accounts amounted to only $100. a month; his monthly discounts would be $2.00, and his yearly saving from this source $24.00. Here is a case where a man with $100 capital, turned over every month, makes 24% on it, merely through taking his discounts. A turn over of $1000 a month would yield, in the same way, a profit of $240. a year.

There is no other source of income that yields so high a return to the merchant as this opportunity of discounting his bills. Never fail to take advantage of it. It is important enough to represent the difference between success and failure.

Some one may ask how the 36% is obtained. It works this way; 2%, 10 days, net 30 days, means that your bill of $100 is due 30 days from to-day. You are allowed 10 days grace, and if at the end of ten days (or at any time during that period) from the date of your invoice you are in a position to pay the bill you get a discount of $2.00 i.e. you pay $98. That $2.00, represents interest received for a period of 20 days, which is at the rate of $36. for 360 days.

Whatever else you may fail to do, therefore, always make arrangements to take advantage of your discounts. Many a man has found at the end of the year that this source of resource has saved him from financial trouble.

Is Business Better With You?

Business is undoubtedly better—much beter—and it is improving right along. And here is a little secret too Business has shown the greatest improvement with those individuals and firms that have put forth the greatest effort to bring business back to a satisfactory stage and have gone out and pulled the clouds away from the face of prosperity by main force!

Are you getting your share of business? If you are, you know that you owe it to hard work. If you are not, you have no right to blame anyone but yourself—because there is business to be had.—Hoovergrams.

The Johns-Pratt Company of Hartford, Connecticut, whose selling arrangements through the Johns-Manville Company were recently dissolved by mutual consent, have established a New York office located in the Liggett Building, 41 East 42nd Street. It is intended to have a complete representation at this office for the three departments of the company—Noark fuses and protective devices, Vulcabeston packing and Johns-Pratt molded products.

The second annual report of the Scientific and Industrial Research Council of Alberta, recently received, constitutes a complete review of the work done under the direction of that body during the year 1921. Research was carried out on coals, road materials, salt deposits, boilers, etc. The authoritative nature of the information contained renders the report valuable to those interested in the resources of Alberta.

What Contractor-dealers Say

In general, contractor-dealers are busy with wiring work. Appliances are moving at about the usual rate though special conditions are affecting the sale of some lines, such as fixtures, fans and heaters. Prices are mostly steady, with slight reductions in some lines. Building is increasing and there promises to be activity in this line for some time to come, which movement will, of course, be reflected in the electrical business. Some contractors report a brisk demand in old house wiring.

Fixtures—Medium-priced residential types are in good demand, due to activity in building industry.

Fans—The unusually cool summer has not helped the sale of fans, and dealers report this business not up to last year.

Radio—Radio equipment business is fair in spite of static conditions and usual summer lull.

Cleaners—These are moving well in some sections due to special sales effort by dealers.

Lamps—Prices steady, and stocking up for fall needs is going on.

Bell-ringing Transformers—This is another line that has been favorably affected by home-building activity.

Wire—There is a consistent demand for wire due to the activity in house building. Prices remain steady.

Rigid Conduit—Prices steady, brisk demand.

Farm-Lighting Plants—It is predicted that the improvement of conditions in the West will result in a larger demand this fall.

Heaters—The prospects of a coal shortage are causing some activity in this line.

Trade Publications

A well illustrated catalogue, No. 53 E, has recently been issued by Nerlich and Co., 146-148 Front Street West, Toronto. A variety of electrical fixtures and glassware are listed, as well as electric lamps in table portable, utility, desk, boudoir and floor styles. Lines of flash-lamps and heating appliances are also shown.

A line of motor starters which afford complete protection to the operator and the motor has been developed by the Westinghouse Electric & Manufacturing Company. These starters are fully described in a publication, Folder 4500, recently issued by the Westinghouse Company.

The Duncan Electrical Company, Montreal are showing a supplement (Number 1) to their Catalogue Number 7. This supplement contains illustrated descriptions of a number of new lines now being manufactured by this company, including push button canopy switches, pendant switches, feed through switches, receptacles, plugs and caps of various kinds.

A new publication on street lighting is being distributed by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The publication, Folder 4439, "Turning Night Time into Day Time" shows the advantages of adequate illumination, describes some of the Westinghouse lighting fixtures, and gives illustrations of a number of the company's typical city installations. One of the products described is the Westinghouse disconnecting pothead, which is supplied in all Westinghouse light posts. This device automatically disconnects the wires from the underground circuit in case the pole is broken and also completes the cable circuit so that the other lamps on the street will not go out.

Personal

Mr. A. E. Morrison of Wellington, Ont., electrician employed by the Dominion Canning Co., reports a very narrow escape recently when a high voltage wire came in contact with a pair of pliers in his hip pocket.

Mr. C. W. Stokes, Montreal manager of the English Electric Co., has resigned and will engage in business in Montreal. Mr. Stokes has been with the English Electric Co., and its predecessor, the Siemens Co., of Canada, for some twelve years and has had a wide and varied experience.

Fred R. Miller, of the firm of Roger Miller & Sons and a member of the Transportation and Hydro-electric Commissions, was operated on recently for tissue adhessions. The operation is said to have been successful, and Mr. Miller is expected to be around in two or three weeks' time.

Messrs. J. Alex. Regan, and T. J. McFadden, Quebec and Ontario representatives, respectively, of the Diamond State Fibre Company of Canada, Limited, have recently returned from their holidays. Mr. Regan's vacation was spent along Lake Champlain and at Wilmington, Del., and Mr. McFadden's in Northern Ontario.

Mr. I. W. Levine, for the past eight years associated with the Electrical Equipment Co., Ltd., Montreal, has resigned to enter a larger field, and one offering a wider scope for his ability and ambition. Mr. Levine is the direct representative, for Eastern Canada, (with headquarters at Montreal) of the Federal Porcelain Co., Carey, Ohio; of Smith & Stone, Limited, Georgetown, Ont., and Electrical Fittings & Foundry Ltd., Toronto.

Mr. Eugene Vinet who has been connected in various engineering and organization positions with the Shawinigan Water & Power Co., for the past 16 years since, and prior to, his graduation from McGill University in electrical engineering, is now employed by the Middle West Utilities Co. of Chicago, Ill., as assistant to G. W. Hamilton, supervising engineer over all companies controlled by the Middle West Utilities Co. Mr. Vinet was secretary-treasurer of the Canadian Electrical Association for the past two years and, as already announced, has been replaced in that capacity by Mr. Louis Kon.

Company Incorporations

L'Industrie Lemay & Fils, $49,000, L'Ascension, Que. Generation, etc., of electric power.

Ontario General Omnibus Co., $600,000, Toronto, Ont. Operation anywhere in province.

Rural Light & Power Co., $45,000, Yamaska, Que. Construction and operation of transmission lines.

Electric Lighting Products, Ltd., $40,000, Toronto, Ont. Manufacturing, etc., of electric appliances.

La Compagnie Hydraulique de Portneuf, Ltee., $300,000, Quebec. Generation, transmission, etc., of electric power.

Radiophone Corporation of Canada, Ltd., $500,000, Toronto. Manufacture, etc., of radio equipment.

Crescent Electrics, Ltd., $100,000, Toronto. Manufacture, etc., of machinery and other goods.

Canadian Electrical Equipment Co., Ltd., $10,000, Toronto. Manufacture, etc., of electrical and other machinery.

Electric Lighting Products, Ltd., $40,000, Toronto. Manufacture, etc., of all kinds electric appliances.

Current News and Notes

Annapolis Royal, N. S.

Work has been started by the town council on an extension to the electric lighting system from Lower Town to Evansville. The chairman will buy 1 or 2 carloads of poles, 3 or 4 miles of copper wire, 33 street lamps and 300 lights.

Burlington, Ont.

Expropriation proceedings are to be taken against property owners at Hamilton Beach, who have refused to fix a price on their lands across which the new Hydro-Electric transmission line, from Queenston to Toronto, runs. This decision was made recently at a meeting of the commission when the right-of-way department was authorized to take this step.

Campbellford, Ont.

In a recent storm a bolt of lightning struck the municipal power station and completely paralyzed the power and light situation. Two switch panels were burnt out as well as the coils on the generator. A smaller generator is being operated and sufficient current is being generated to supply the lighting needs of the village. Since the recording meter shows no surge on the line at the time the damage was done, it is thought that the building itself was struck and not the wires. It was also pointed out that most of the damage was caused by the fire which resulted and not by the lightning. James McMullen who was in charge of the plant at the time escaped injury.

Chatham, Ont.

While at work on the new office building of Dr. Shirley Holmes on Sixth street last evening, Herman Cartier, local electrical contractor, fell to the ground, sustaining a severe injury to his back. After first aid was rendered, the injured man was removed to his home. He will be able to resume his duties in a few days' time.

Cobalt, Ont.

The Timiskaming Telephone Company, in a circular sent out recently to its subscribers, has announced its readiness to discontinue its service in Cobalt if the town council insists, rather than consent to a franchise granting rentals on the same basis as those in force in Haileybury and New Liskeard. Cobalt rates are higher and the council will consider the question of offering the company a franchise at the lowest rates or alternately leaving the town. The company has operated for the past five years without a franchise in Cobalt.

Hastings, Ont.

The victory at the polls for the by-law authorizing municipal assistance to Charles Fowlds for generating power for the village ensures Hastings of a supply of power at $20 a horse-power. The by-law was first submitted about two months ago, and was defeated by a majority of two votes, but on second submission it was carried by a majority of 21. Mr. Fowlds owns outright the water rights in Hastings, the deed to which was obtained in 1861.

Kingston, Ont.

The Street Railway Company, in order to meet the city in regard to further paving operations along the railway line , will agree if the Council will amend the present agreement as to fares and permit the company to collect a cash fare of six cents, instead of five cents. To relay tracks with heavier iron it must increase its revenue in this way.

Kitchener, Ont.

A radio broadcasting station has been installed by the Daily Record. The set operates on a wave length of 420 metres covering a radius of 60 miles.

That the property owners of Kitchener are overwhelmingly in favor of improving the street railway equipment and service is evident in the recent vote for the street railway bylaw. The bylaw was carried 421 to 26, leaving a majority of 395. The bylaw is to raise $70,000 for the purpose of purchasing three new up-to-date cars, to build new car barns and to improve the present system by an increased double trackage.

It is said that investigation is being made of the possibilities of a trackless trolley system in Kitchener for extending the service.

Ottawa, Ont.

The Standard Underground Cable Co., of Canada, Sherman Ave. N., Hamilton, Ont., has been awarded the contract by the Ottawa Hydro Electric Commision, 100 Bank St., for high and low tension cable.

At a meeting of the Ottawa Hydro-electric Commission held recently the contract for 23,000 feet of high-tension cable and 16,000 feet of low-tension cable was awarded to the Standard Cable Company of Montreal, at a price of $54,500. The tenders were in bulk and the tender price of the Standard Cable Company was $500 less than the next bidder.

Owen Sound, Ont.

Messrs. E. F. Pigeon and N. R. Easter of Owen Sound have recently started an electrical contracting and merchandising business, at 1033 2nd Ave. East, Owen Sound. They are carrying a full line of electric fixtures and supplies.

Peterboro', Ont.

G. N. Gordon, K. C., M. P., has protested to the local commission against seasonal manufacturing, such as canning factories, being provided with power at this time of the year. He stated that the manufacturers who purchase power for the whole year were cut off either entirely or part time, while the canning factory ran a few weeks and then shut down. to the injury of the plants that were keeping men employed every working day in the year. He claimed that these plants should put in steam because they are operated only for a short time, while the manufacturing plants in Peterboro' and other cities, carrying out large contracts which they had agreed to fulfill, should not be cut down.

Queenston, Ont.

The third of the Hydro Electric Commission's huge 60,000 horsepower generators at the new Chippawa Plant at Queenston was given its initial run on July 25 without mishap. After a preliminary tuning up, which may require from a week to ten days, Number Three, as it is known at the Chippawa power house, will commence delivery of power to the Hydro's lines in Western Ontario. The conclusion of the third unit will bring the total of power available from Chippawa to 175,000 horsepower.

Quebec, P. Q.

At a meeting of the board of directors of the Quebec Railway Light, Heat and Power Company. President E. A. Robert in an exhaustive review of the situation, gave indications of future expansion and prosperity for the company and its affiliated interests.

The financial statement for the first six months of the fiscal year ending June 30th., shows gross earnings of $1,346,918 as compared with $1,359,514 for the corresponding period a year ago. Operating expenses and fixed charges for the first six months this year are $1,230,066, as compared with $1,364,996, leaving a net surplus of $115,952 as compared with a net deficit of $5,481 for the same period in 1921, showing an improvement of $121,434 for the first six months of 1922 as compared with the same period in 1922.

The following directors were also present, Col. J. E. Hutchinson, K. B. Thornton, A. C. Parker, N. Z. Valiquette and Senator Lorne C. Webster.

St. Catharines, Ont.

The Niagara, St. Catharines & Toronto Railway Company is experimenting with a new trolley wheel. The new wheel, which is egg-shaped, does not revolve, but slides along the trolley wire, and is fashioned to do away with the constant slipping of the trolley poles, causing delays.

St. John, N. B.

Work has been started on a transmission line between St. John, N. B. and Moncton, N. B., by the New Brunswick Electric Power Commission, the first section will be erected by W. I. Snook, c/o Royal Hotel, St. John, N. B., second section by Maritime Construction Co., Fairville N. B., and the third section by McNab Construction Co., Halifax.

On the opening of the meeting of the Common Council in committee recently, the Mayor said he had received copies of the contract proposed by the N. B. Hydro Commission for the supply of energy from the Musquash to the city. He also said he was not yet ready to present his report, as the information he desired to secure and which had been promised him had not been sent.

Saskatoon, Sask.

The contract for electrical work on the collegiate institute, Caswell Hill, has been awarded to the Electric Shop Saskatoon, at a bid of $5,363.74; other bidders were, Wheaton Electrical Co., $5,990.; General Electric Co., $6,775. It is said that the plans will be slightly revised, which will probably reduce the contract price of general contract and electrical work.

Toronto, Ont.

A severe lightning storm recently damaged the insulators on the transmission lines and an oil switch in the Niagara station of the Toronto and Niagara Power Company. Part of the load was picked up by the Hydro lines and was carried until the Toronto and Niagara power lines were in service again.

Windsor, Ont.

Telephone service along the border here is badly disrupted as result of electric storms during the week, no fewer than 300 phones, business and residential, being out of commission. Repair work here, will not be completed for ten days. Whole circuits in residential districts were put out of commission by the lightning.

Rejecting the recommendation of the Finance Committee to allow increased rates for business telephones as requested by the Bell Telephone Company, Sandwich Town Council will join with Windsor in taking the case to the Dominion Railway Board,

Winnipeg, Man.

The question of extending the franchise of the Winnipeg Electric Railway Company, the tram system of this city, for a period of ten years is being discussed with an increasing interest by the citizens. Whenever the question of extending the franchise of the tram company is raised, there has been a substantial opposition in the city council, which has so far succeeded in preventing action. The last proposal was to guarantee the bonds of the tram company and allow them to get the money for the needed extensions. It is said that this the company is unwilling to accept; they insist they can get the money if they get the extension of time.

Wiring Contracts Awarded

Barrie, Ont.

W. Robinson, $4,000 res., 6 Eccles Street.

Birchcliff, Ont.

Smart & Walsh, 130 Bingham Ave., Toronto, $7,000 each, 2 stores; $6,000 each 3 res., Birchcliffe Ave.

Brockville, Ont.

A. G. Dobbie & Co., King Street, W., $10 000 store, King & Bethune Sts.; $25,000 masonic temple, George Street.

Bridgeburg, Ont.

Wm. Simpson Co., Queen St., Niagara Falls, $40,000 school, Wintermute.

Anger Electric Co., $4,000 each, 6 res. Phipp Street.

Calgary, Alta.

Cunningham Elec. Co., Lineham Blk. warehouse, 11th Ave., 8th & 9th Sts.

Brotherston Electric Co., wiring on clubhouse, G.W.V.A.

Cap De La Madeleine, Que.

P. E. Lacroix, Pont St. Maurice, $6,000, 2 flats, St. Alphonse St.; $8,000, 6 tenements, Rocheford & Montplaisir Sts.

Cobourg, Ont.

Geo. Lowe, King St., $12,000 add., school.

Cochrane, Ont.

Reed & Son, $5,000 res., 5th Ave.; $5,000 res., 4th Ave.

Fort William, Ont.

Fort William Electric Co., 107 S. May Street, $50,000 add., to school, Franklin Street.

Fredericton, N. B.

Wm. Boone, South Devon, York Co., $20,000 add., hotel, Westmoreland Street.

Grantham Twp, Ont.

Clifford Electric Co., 19 Ontario Street, school.

Guelph, Ont.

A. N. Knowles, London, Ont., on Guelph Collegiate. Cost of building, $350,000. Architects, Hutton & Souter, Hamilton, V. K. Stalford, consltg. engr.

Hamilton, Ont.

J. A. Dynes, Prospect St., $20,000 apts., Main & Emerald Streets.

Islington, Ont.

Albert Dunk, 18 Lynden Ave., Toronto, $4,500 res., Nesbitt Ave.

H. F. Bigham, $5,000 res., Kipling Ave.

Kitchener, Ont.

Otto Reiber, 84 King St. S., Waterloo, $4,500 res., Irvine St.

Star Electric Co., 91 West King St., $5,000 res., Mansion St.

Lakeview, Ont.

Harris & Marson, 81 A. Parkway Ave., Toronto, $32,000 add. school opp. Rifle Ranges.

Lindsay, Ont.

Aylesbury & Brewer, $6,000 res., Albert St.

Lindsay Electric Wiring Co., $4,000 bungalow, Vambridge St. N.

London, Ont.

Bowley Electric Co., 306 Dundas St., $15,000 rebldg. store.

Moncton, N. B.

G. F. Perry, Main St., $4,500 res., Highfield St. extn.

Wm. G. Crowley, St. George St., $7,000 res., Elm & Gordon.

Montreal, Que.

H. R. Cassidy, 255 Regent St., $7,000 gasoline stn., Cremazie & St. Lawrence Blvd.

Cdn. Comstock Co., 10 Cathcart St., $1,000,000 Office Bldg., Guy & Sherbrooke.

M. Deschenes, $15,000 res., DesJardins St.

U. Houle, 150 Eadie St., $4,500 res., 125 Lecarnon St.

D. Goulet, 239 Edouard Charles St., $18,000 res., St. Hubert St.

Mr. Larmond, $8,000 res., Forsyth St.

E. Marcotte & Freres, 450 Roy St. E., $15,000 alt. & add. to apts., 198 Mance St.; $45,000 apt., Jeanne Mance St.

Mr. Meloche, $16,000 alts. to res., 345 Sherbrooke St. E.

Wm. Rochon, 454 Lafontaine Park, school, Stadacona St.

J. A. St. Amour, 2171 St. Denis St. monastery, N.D.G. Ave.; $22,000 res., Denis & Beaubien Sts.

J. A. Anderson & Co., 205 Mansfield St., $75,000 cafeteria, 459-71 Philips St.

A. Barbeau, 1469 Ontario E., $10,000 res., Des Erables St.

Booth Bros., 5727 Sherbrooke W., $15,000 stores, Sherbrooke St.

Crown Electrical Co., 169 Ontario St., $7,000 res., 91 St. Alexander Street.

Collyer & Brock, 131 St. Alexander St., $30,000 bldg., Pine Ave.

R. S. Muir & Co., 32 Park Ave., $20,000, 2 res., Wilson & Cote Sts.; $18,000, 4 flats, Grosvenor Ave.; 3 res., Draper Ave.

J. Thibodeau, 847 Marie Anne E., $11,000, 3 flats, 93 Fabre St.

Niagara Falls, Ont.

E. Thomas, 121-2nd Ave., $3,000 res., Fourth St.; $3,000 res., Maple St.

Scott & Hughston, c/o owner, $85,000 transformer station, South St. & Victoria Ave.

North Bay, Ont.

Herbert & Co., $4,500 res.

Outremont, Que.

J. A. Roy, 2561 Park Ave., $95,000, 22 suite apt. house, Durocher & St. Viateur.

Ottawa, Ont.

W. Stewart, 385 Daly Ave., $5,500 res., Kenora Ave.; $5,800 res., Chapel St.; $7,000 res., 1st. Ave.; $5,000 res., Pansy Ave.

W. Cowell, Westboro, $4,200 res., Hampton Ave.

P. Ackroyd, 420 Bank Street, re-wiring city police station; also on residence, Harmer Ave., for Superintendent Tobin of Ottawa Electric Railway Co.

H. L. Allen, 272 Bank St., $10,000 res., Willard Street.

H. Hardy, Ella St., $5,500 res., Fairmont Ave.

Port Dover, Ont.

J. H. Young, $5,000 res., 1st Ave.; $4,000 garage.

E. Steele, $3,800 res., St. Andrew St.; $3,000 res., McNab St.

Richardson & Cross, 81 King St., E., factory Hurlbutt Shoe Co.

Preston, Ont.

H. H. Depew, Edmonton, $136,363 hospital bldg. Contract price $2,593.

Saskatoon, Sask.

Wheaton Electric., 2nd Ave., $40,0000 college, 8th St.

St. Hyacinthe, Que.

J. A. St. Amour, 2173 St. Denis St., $700,000 hospital, Hotel Dieu.

St. Mary's, Ont.

A. Willard, $40,000 add. factory, Hurlbutt Shoe Co.

Sault Ste Marie, Ont.

J. H. Stearns, 112 Lansdowne Ave., $5,000 res., Dennis St.

O. C. Carney, 516 Queen St. E., $8,000 res., Summit Ave.

Penfold & McBride, 76 Pim St., $6,000 res., Pim St.

St. Catharines, Ont.

J. Desand, 187 St. Paul St., $3,500 res., Russell Ave.

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A. B. Cudney, 22 Thomas St., $5,000 res., Queenston Rd.

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Stratford, Ont.

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Toronto, Ont.

Art Electric Co., 335 Yonge St., $20,000 res., 34 Rosedale Rd.

P. J. Dunn, 490 Quebec Ave., $7,500 each, 3 res., Patterson Ave.

Dunsford & Young, 649 College St., $6,500 each, 8 res., Melita Ave.

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L. Hollows, 1564 Danforth Ave., $7,000 a pr., 3 pr. res., Osborne Ave.; $7,000 a pr., 6 pr. res., Lawlor Ave.; $8,000 a pr., 2 pr. res., Lawlor Ave.; $6,000 pr. res. Lawlor Ave.

J. H. Harris, 683 St. Clair Ave. W., $20,000 store, 1258 Yonge St.

Harris & Marson, 81 A. Parkway Ave., $137,751 nurses' home, Riverdale Pk. Contract price $2,935.; $40,000 school, Runnymede. Wiring contract price, $666.

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Nichol & Fagan, 111 Logan Ave., $8,000 a pr., 10 pr. res., Lawlor Ave.; $8,000, 2 pr. res., Scarboro Road.

Perrin & Hallam, 258 Laughton Ave., $12,000 each, 2 res., 6-7 Breamore Gdns.

H. Phillips, 36½ McGill St., $10,000 res., Turner Rd.

Ramsden & Roxborough, 36 Front St. E., $200,000 physicians' bldg., Bloor Street.

Smart & Walsh, 130 Bingham Ave., $60,000 memorial hall, Silverbirch Ave.

B. C. Taylor, 25 Marchmont Rd., $10,000 res., Glendale Ave.

Taylor Bros., 25½ Norwood Road, $5,500 store, Kingston Rd.

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Star Elec. Co., 185 Lombard St., add. to grain exchange.

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Hydro-Electric Power Commission of Ontario,
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16

Selling Points of Electric Sewing Machines

Why should a woman buy an electric sewing machine in preference to a treadle driven one, or having a treadle driven machine why should she buy a motor for it?

A motor driven sewing machine will turn out better work in less time and with less fatigue than a treadle driven machine. Better work because of more flexible and positive control and because the operator can devote her entire attention to handling the goods on which she is working, not being distracted by the effort of propelling the machine. The work is done more quickly because the electric motor permits the machine to stitch faster than if driven by foot power and greater average speed can be maintained because of better control of the work in hand. There is less fatigue because all of the strenuous physical effort is eliminated.

Every woman likes pretty clothes and likes to have her children dressed becomingly and well. These things are all possible at a minimum of expense and exertion with the electrically driven sewing machine.

Reliable figures show that 50 per cent of the cost of outer garments can be saved by electrification of the sewing machine, 25 per cent on under garments, from 25 to 35 per cent on children's garments and 15 per cent on flat work. These figures depend, of course, on the thrift of the housewife.

From a standpoint of comfort and health, without exception, there are no treadle machines which will permit the user to sit straight when using the machine. The strain of constantly bending to the side to operate the old type of machine is the cause for many aches and headaches, all of which is eliminated through sewing the electric way.

Then again the practical type of machine makes it possible to sew in any room in the house, or on the porch, anywhere that there is an electric socket. Overcoming belt trouble does away with one of the most unpleasant features of the sewing machine.

Sources of Trouble in Domestic Appliances

To determine the causes of trouble with domestic appliances and their possible elimination, the Society for Electrical Development has addressed central stations and dealers throughout the country.

As a result of the many replies received certain weak points common to each device will be brought to the attention of manufacturers, in the expectation that these weaknesses can be obviated to a considerable extent. In general the replies showed that the chief causes of trouble in motor driven appliances such as washing machines and vacuum cleaners were due to carelessness in operation. Failure to lubricate being the chief source of trouble. In relatively few cases were the breakdowns due to defective design.

Many cases were directly attributable to the connecting of appliances to lamp sockets, especially of the key type designed to carry only 250 watts. With iron and vacuum cleaners much trouble is experienced with the wearing out of extension cords, and the breaking down of sockets from both electrical and mechanical strain.

All of which points to the importance of educating the public to put in convenience outlets, and replacing the flexible cords when worn—only the highest grade cord should be used, and in the case of heating appliances this should be asbestos covered with ample capacity for the current required.

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50	h.p., 3 ph.,	25 cyl.,	550 volts,	720 r.p.m.
35	h.p., 2 ph.,	60 cyl.,	200 volts,	1150 r.p.m
30	h.p., 3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
30	h.p., 3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
25	h.p., 3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15	h.p., 3 ph.,	25 cyl.,	220 volts,	720 r.p.m.
15	h.p., 3 ph.,	25 cyl.,	550 volts,	750 r.p.m.
15	h.p., 3 ph.,	60 cyl.,	220 volts,	1200 r.p.m.
13	h.p., 3 ph.,	25 cyl.,	550 volts,	700 r.p.m.
10	h.p., 3 ph.,	66 cyl.,	220 volts,	1333 r.p.m.
7½	h.p., 2 ph.,	60 cyl.,	200 volts,	1120 r.p.m.
5	h.p., 3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
5	h.p., 3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3	h.p., 3 ph.,	60 cyl.,	550 volts,	1750 r.pm.
3	h.p., 3 ph.,	60 cyl.,	550 volts	1120 r.p.m.
3	h.p., 3 ph.,	25 cyl.,	550 volts,	1500 r.p.m.
3	h.p., 3 ph.,	25 cyl.,	550 volts,	1400 r.p.m.
2	h.p., 3 ph.,	60 cyl.,	550 volts,	1750 r.p.m.
2	h.p., 3 ph.,	25 cyl.,	550 volts,	1440 r.p.m.
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1	h.p., 3 ph.,	25 cyl.,	110 volts,	1420 r.p.m.
1	h.p., 3 ph.,	25 cyl.,	220 volts,	710 r.p.m.
½	h.p., 1 ph.,	60 cyl.,	110 volts,	1725 r.p.m.
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Generation, Transmission and Application of Electricity

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Coal Shortage Offers Electrical Industry Opportunity to Demonstrate its Value

The coal situation, which is particularly acute in Central Canada, is destined to give electricity, and electrical men, this autumn, an opportunity to demonstrate their value to the community in a time of emergency. We drew attention in our last issue to the fact that at the Queenston-Chippawa development alone, there would be available some 150,000 h.p. of electric energy owing to the fact that this plant will have five units installed to meet an industrial demand that has not developed as rapidly as might naturally have been expected. It may well be that this amount of energy, available in the Province of Ontario, may prove a regular God-send during the coming winter as an auxiliary to a probably limited coal supply.

It is generally recognized, of course, that electric energy developed from our waterfalls can never be depended upon to take care of anything more than a small fraction of our heating load. Electric energy is more usefully employed in the form of power and light. For the present, however, we must make the most of a very bad job, and if the electrical men ever had an unusual opportunity to demonstrate that the product they make, and sell, is one that can come to the aid of the citizens in their greatest need—right now is the moment.

Quite aside, however, from the benefits to be derived by the general public are the financial profits that can accrue to the industry itself. The situation represents a possible demand for perhaps two or three hundred thousand heaters of various kinds, along with which electric ranges will naturally be associated. In actual effect too, this will represent but a small part of the new business available. Only a very limited number of homes are sufficiently well wired to connect up electric heaters or ranges, and so, as the second step in the development, we have an opportunity for the sale of many thousands of installations of wiring equipment, if our contractors will only view the situation in a business like way.

It would be well in some ways if the demand stopped here and involved only contractors and dealers. However, the central station is immediately concerned, for many of its lines are already loaded to capacity. The addition of heaters will mean more copper and more transformer capacity, which in turn will benefit the manufacturers of these products.

It is thus very evident that the electrical industry not only has a wonderful opportunity for helping the citizens, but an equal opportunity of benefitting itself. Let us ask ourselves the questions,—"Are we moving fast enough?" "Are we making the necessary plans to take advantage of the profits that will offer during the next two or three months?" If we delay, our chance is lost for a year at least.

Indirectly, there is another factor to be considered, viz. the moral effect on the citizens, if electricity demonstrates its value at this critical time. Electricity is still looked upon by many as a luxury. Here is the opportunity to show that it is a necessary utility,—that it can be one of the biggest factors in maintaining the smooth running course of our industrial and social life. If we take the fullest advantage of our present opportunities we shall go a very long way towards establishing electricity in the minds of the general public as a necessary part of their regular existence.

Intensive House-to-House Selling Does Produce Results

An article in the July 15th., issue of the "Electrical News" entitled "House to House Appliance Selling," has raised some criticism on the score that it was giving encouragement to undesirables—the peddler class.

The argument may be well taken, but it is worth noting that this article was written by a member of one of the largest Central Station Companies on the continent and one of the most vigorous in merchandising electrical equipment. Careful reading of the article indicates also that the class of salesman who is making a success of this work is well trained and well educated in the merits of his goods. Indeed reading between the lines of the article we would judge that these men are a quite superior type, and entirely such as the average electrical dealer would consider a credit to the industry.

Nor can we overlook the fact that the experience of this large company is a valuable criterion of the possibilities underlying house-to-house canvassing and Mr. Hogue says: "This class of merchandising can only be sold in large quantities by this door-to-door canvass." Might it not be that Canadian dealers would do well to follow the same plan? Don't let us condemn a tried policy until we prove it inapplicable in our own case. Suppose our electrical dealers put their dignity in their pockets for the time being, and give it a try out. Our guess is that they will find it requires all the ability, knowledge, tact and ingenuity they can muster, but, we believe at the same time, that there is no other way to obtain as satisafctory results.

It has been tried in Canada, too—with splendid success. In the near future we shall have an interesting story to tell you about it.

Murray Report on Ontario Hydro and Sir Adam's Reply

United States' Engineer Makes Adverse Report on Ontario Hydro Operations—Reply, Just Issued, Says Murray Statements at Absolute Variance with Well Known Facts

Some time ago the National Electric Light Association engaged Mr. W. S. Murray of the consulting engineering firm Messrs. Murray and Flood, New York, to make a report of Government Owned and Controlled, as compared with Privately Owned and Regulated Electric Utilities in Canada, and the United States. Mr. Murray's report covers a very wide range and occupies some 225 printed pages including a number of illustrations. We have delayed making mention of this report because it was announced immediately by Sir Adam Beck, chairman of the Hydro-electric Power Commission of Ontario, that an answer would be prepared forthwith and we believed that a brief review of both report and answer in the same issue would have the greatest value for our readers. On account of the voluminous nature of both these publications it is impossible to do more than summarise the most important arguments presented. A quantity of valuable information is given in both reports and to obtain an accurate determination of the status of the whole discussion it would be necessary that our readers should digest the printed reports as published in full by the National Electric Light Association on the one hand and the Hydro-electric Power Commission of Ontario on the other. The salient points are, however, presented, we believe, in the following resume:

Since the municipally controlled operations in Ontario are on a much larger scale than anything of a similar nature anywhere else on the continent Mr. Murray's report deals chiefly with the Ontario System. Briefly it may be said that his conclusions are exceedingly unfavorable and he strongly urges that no such scheme of operation should be tried in the United States, because, to use his own words, "What has been done in Canada could never have been done in the United States." This, at first sight, would almost seem like a recommendation for the Ontario System, intimating that the good results achieved in Canada could not be achieved in the United States. However, Mr. Murray's conclusions, given below, do not bear out this interpretation.

In Mr. Murray's report under the heading "Summary Report" he outlines the origin of the hydro movement, its growth, the history of power development, power of the Hydro Commission, the attitude of the people, question of taxes, the cost and capacity of the Queenston and Chippawa development, Nipigon development, question of rates, comparison of costs in Ontario with other localities, and so on.

Statements Re Power Costs

Regarding power costs, for example, the report states that, "the average cost of power to these people of Quebec is 32 per cent. less per kw.h. generated than the cost to all the people receiving Hydro-electric power in the province of Ontario, while it is 27 per cent. less than to the consumers of the Canadian Niagara district, whether they are served by government or privately owned electric utilities.

"The private companies in Quebec deliver 84 per cent. more energy per capita than does the Hydro-electric Power Commission to its customers in Ontario, while the generating capacity available per 1,000 population is greater by 89 per cent. than those available upon the lines of the Hydro-electric Power Commission of Ontario."

Comparing the cities of Toronto and Montreal as to average cost of power the report goes on to say. "The average cost of power to customers of Montreal was 1.13 cents per kw.h. for 1920. At the same period the average cost of power delivered to the customers of the Toronto Hydro-electric System was 1.47 cents per kw.h.—29 per cent. greater than that of Montreal.

Mention is also made of the cost of street lighting, and here again it is claimed that the cost of street lighting in Montreal is about 47 cents per capita, while it is about 67 cents per capita in Toronto.

Reference is also made to the un-uniform power costs in Ontario, Mr. Murray reporting that the system of rates making in Ontario is "fundamentally wrong."

Referring to the cost of the Queenston Chippawa development, Mr. Murray argues that the present permissable diversion of water on the Canadian side will only allow an effective capacity, including the Ontario Power Co. recently purchased, of 351,500 h.p., or with one unit in reserve 406,500 h.p. "Upon the basis of the above figures the total investment per installed h.p., without reserve would be $252., while the investment per h.p. with the reserve capacity, would be $218." Mr. Murray sums up as follows.—

Summary of Conclusions

After a careful analysis of the governmentally-owned, controlled and operated electric utility structure as represented in the Hydro-electric Power Commission of Ontario, I am of the opinion, firstly, that the principles of its application can find no place in the United States; secondly, that to attempt the substitution of its principles of control and operation within the States would be to strike a blow at economic structures, the present existence of which are not only far better equipped to protect the public interests in their conjunctive relation with the public service commissions of the States regulating their rates, but it would also be to strike an equal blow at the shareholders of the electric utilities which are now serving the American public; and, thirdly, that the Hydro-electric Power Commission owes its being only to the fact that a public service commission on the order of those operating in the States was not in existence in the Province of Ontario at the time of its creation.

I support the above statement in the following conclusions:—

(1) Power as applied in Ontario from the governmentally-owned and controlled system in associate relationship with the Hydro-electric Power Commission to be superior in kind to that supplied by the privately-owned electric utilities of the United States must be more adequate, more reliable and cheaper. The facts show, however, that the electric utilities of the States hold more power in reserve and sell more energy per capita served, that by that token they can claim a greater reliability of supply and that the supply is cheaper to the consumer.

(2) At the end of the fiscal year 1920, out of the total power plant capacity operated by the Hydro-electric Power Commission only 23 per cent. of it was constructed by the Hydro-electric Power Commission; the remainder represents plant capacity constructed at the initiative and risk of private investors, and in acquiring ownership of it, such intangibles as franchise rights, good-will and other intangibles were included in the purchase. This intangible cost, therefore, is represented in power "at cost." If a governmental plan of like characteristics to that of the Hydro-electric Power Commission is to be inaugurated in the United States,

it must include the purchase of or the contracting of power from existing utilities and the same problem of including intangibles will be presented here.

(3) The building of new power plant facilities under the auspices of governmental-ownership, as shown in the cases of Nipigon and Chippawa, both in respect to policy and cost, is not to the economic interest of the people.

(4) The advocates of government or municipal ownership of electric utilities claim reduction in the cost of power by virtue of

- (a) Elimination of taxes.
- (b) Elimination of dividends.
- (c) Elimination of high-salaried executives.
- (d) More economical wage and higher efficiency in labor scale.

With regard to (a)—taxes are not eliminated. Just as much money in taxes is paid. The difference is in their distribution. In the case of private ownership, only the users of service pay the tax bill, while in the case of government-owned utilities all the people pay the bill.

With regard to (b), (c) and (d), notwithstanding dividends, high-salaried executives and the wage and labor claim, the answer is, when the total operations are summed up, the people receive the power at less cost through private ownership under regulation.

(5) The investment of capital in electric utilities under private interest control is far better protected from extravagance than when that capital is governmentally-owned, for the reason that plans and estimates for such capital expenditures not only must gain the approval of a trained engineering and managerial staff and an experienced board of directors of the companies, but it also must have the critical review of the banker and the private financial investor. In the case of government-owned utilities, the directing heads are seldom specifically trained in the business under their jurisdiction, and value of securities is not based upon the value of the property or the efficiency of management, but upon the taxing power of the government.

Arms, legs and body are useless without the head. A high-salaried executive usually saves many times (his salary included) the losses incurred by the cheaper and less efficient executive. Accomplishment by individuals in control of private enterprise is under keener observation than is the case when those in charge are governmental or municipal officers.

(6) Governmental ownership eliminates all incentive for gain and throttles initiative. This is evidenced by the far greater growth of privately-owned utilities.

(7) The Hydro-electric Power Commission is the judge of its own acts. A commishion cannot fairly be the judge of its own (and others') rights in contentions.

(8) Honesty of purpose does not necessarily reduce the power bill. The structure under which it is administered counts just as much—so far as the price is concerned.

(9) The American companies in the Niagara district are supplemented by steam power far more than those on the Canadian side, and yet on the American side power is being furnished at less cost to the people.

(10) The Commissions of the States fully realize that protection to the people lies in protection to the electric utilities from which they are receiving power. The authority delegated to them to regulate rates, and the constitutionality of the law standing behind any action on their part or on the part of the electrical utilities, provides a structure constructively balanced to do justice to all parties.

(Signed) W. S. MURRAY,
Murray & Flood.

Hydro-Electric Power Commission of Ontario Issues Reply

The Hydro-electric Power Commission of Ontario has just issued its reply under the title "Refutation of Unjust Statements Contained in a Report Published by the National Electric Light Association, entitled Government Owned and Controlled Compared with Privately Owned and Regulated Electric Utilities' in Canada and the United States." It contains 50 odd pages, with a Foreword over the signature of Sir Adam Beck. This Foreword touches upon the items that are covered in greater detail in the report. It states that the Hydro-electric Power Commission had given Mr. Murray information "unstintingly," which Mr. Murray had used in his report, but that the corresponding information respecting the private electric utilities was not forthcoming, as Mr. Murray claimed that this was given to him in "confidence," and goes on to say:

"Mr. Murray has made definite statements purporting to be true but which are at absolute variance with well-known facts. He has misquoted statements, even replacing significant words therein with others. He has presented grossly misleading statements respecting even physical facts within his knowledge, and he has made comparison between entities radically different, when even a proper recognition of the real differences would have created an impression entirely at variance with what he has represented. He has inflated costs in a manner which falsifies the conclusions. Such procedure is characteristic of the use made of much of the essential material embodied in the premises which Mr. Murray has adduced and upon which he has based his conclusions. This accounts for the worthless nature of such conclusions."

Street Lighting in Toronto and Buffalo

The report proper deals with the substantiation of this retort. All Mr. Murray's arguments and charges are not answered, typical items only being considered. An example is the relative cost of street lighting in Buffalo and Toronto. Mr. Murray's report had stated that the Buffalo cost per capita in 1920 was 60 cents. The Hydro report replies,—"As a matter of fact, in 1920, the cost of street lighting in Buffalo was not as Mr. Murray represents it to be, 60 cents, but $1.14 per capita." The difference is explained by the fact that Buffalo's street lights are more than half gas and gasoline. In concluding this item the report adds: "it is interesting to note that Toronto, with little more than half the total expenditure for street lighting, maintains nearly three times the number of street lights that Buffalo does."

On the cost of power in the Niagara district, under the heading. "Mr. Murray absurdly over estimates the renewal reserve of the Ontario Power Co.," the Hydro report states, "Mr. Murray's estimate of the renewal reserves required to be laid aside for the Ontario Power Co. plant is simply absurd; it is ten times too much;" the report continues as follows:—

"The basic assumption on which Mr. Murray has made his estimate of the cost of Niagara power is that the plant of the Ontario Power Company, on account of lack of water which Mr. Murray proposes to use otherwise, will be scrapped with the exception of 40,000 horsepower, held as stand-by. In spite of this fact, that 162,000 horsepower is thus to be scrapped under his own assumption, Mr. Murray has included in his estimate a provision for the renewal of this 162,000 horsepower of the scrapped plant, and allows the absurd sum of $2,100,000 annually, in addition to a provision of $78,000 in respect of the 40,000 horsepower which is to be retained. The annual amount Mr. Murray has thus allowed for renewal of the superseded part of the plant is enough to rebuild it entirely every three or four years, although under Mr. Murray's assumption there is no intention to rebuild it at all. This $2,100,000 is, therefore, pure inflation—not a cent of it is needed even under Mr. Murray's assumed conditions."

The report goes on:—

"Six other items which Mr. Murray has unreasonably over-estimated, while less, individually, nevertheless aggregate a very large amount in excess of the correct figures. For instance, Mr. Murray apparently neglects the fact that the costs of operation, etc., per horsepower are much smaller for a very large and modern station like the Queenston station, and thus he unjustifiably over-estimates this item. Again, when the nature of the physical installation at the Queenston-Chippawa development is considered, the renewal reserves for this plant are too high. In all, these six small items are over-estimated by about $1,500,000. One item only has been under-estimated by Mr. Murray, but this was due to circumstances occuring after he had assembled his data. However, for the under-estimated item proper allowance had been made. One item was nearly correct." Finally the report goes on:—

Costs of Operation and Renewal Reserves at Chippawa

"The capital cost of the development is accepted by Mr. Murray as $69,000,000 and he estimates the annual interest charges thereon at $5,620,000. By division it is evident that Mr. Murray has employed an interest rate of 8.15 per cent., but he carefully refrains from all mention of this fact. Mr. Murray even admits, a few pages before, that the average rate of interest which the Commission will pay on its borrowing is only 5.75 per cent., and he uses that rate in calculating interest for his first estimate. The Commission has never paid an interest rate even approaching 8.15 per cent.

"Using the correct interest rate—5.75 per cent.—it is found that the item which Mr. Murray, without the slightest justification, states to be $5,620,000, should be $3,967,500, and hence on this item alone Mr. Murray has inflated his estimates by $1,652,500.

Total Annual Production Cost

"By such artifices as have just been described, Mr. Murray has estimated a total annual production cost for power of $12,310,000—as against a corrected total even under his own assumptions, of $7,200,000. Thus he has over-estimated the cost of generation by $5,000,000 or 70 per cent. In addition, in calculating the cost of power to the Niagara system, he has under-estimated the revenues of the Ontario Power Company from its own customers, and over-estimated the amount of power taken by them, and thereby increased the inflation of his estimated cost of power to over 80 per cent.

"Summing up Mr. Murray's handling of this estimate, it is found that in the first place he has based it on gratuitous assumptions, and then, without justification, he has over-estimated all the items of cost but two, to a total extent of $5,000,000 or 70 per cent. He arrives at a figure of $25.60 per horsepower per year, whereas a corrected estimate under his assumptions is only $14.00 per horsepower per year."

Regarding a comparison of rates in Ontario, Mr. Murrany's report had stated that the private companies in Quebec delivered 84 per cent. more kw.h. per capita than does the Hydro-electric Power Commission. The Commission's answer is that one large privately owned company in 1920 had supplied to a single customer an amount of power approximating 60,000 h.p., which it is claimed makes a comparison per capita "woefully misleading."

The Hydro report also finds Mr. Murray's comparison of the cost of power in the cities of Toronto and Buffalo to be "very in-accurate." A table is included in the report showing the net average cost of energy in Toronto was $1.10 compared with $1.52 in Buffalo.

Comparison of Yearly Bills

The report contains some interesting tables giving relative yearly bills for electricity for a number of consumers in Toronto, Hamilton, London, Montreal, Buffalo and Detroit in 1920, and draws the following conclusion:

"Comparing the bills in the Ontario cities with the corresponding bills in Montreal, Buffalo and Detroit, the disparity in the costs of electrical service is very evident. Almost without exception, the bills in Toronto, Hamilton and London are lower than the bills for corresponding service in Montreal, Buffalo and Detroit. From the preceding tabular data it is seen that the differences between Hamilton bills and those in cities under private ownership, range from 5 to 600 per cent. in the case of Montreal, from 50 to 400 per cent. in the case of Buffalo, and from 75 to 500 per cent. in the case of Detroit."

The report ends with the following conclusion.

"In entering upon this discussion of the true character of the "Murray Report," it was charged that, in addition to misrepresenting the achievements of the Hydro-electric Power Commission of Ontario, Mr. Murray has made grossly incorrect and misleading statements; he has garbled documentary and other data and then employed them as premises from which to derive conclusions; he has made pronouncements based upon comparisons so inadequate as to be puerile; he has made charges which he fails to substantiate; he has ignored important factors, even disregarding most pertinent engineering data. He has seriously miscalculated the cost of Niagara power; he has omitted to describe the confines of districts he discusses; he has not shown how summaries have been derived; he has made comparisons between unlike units with respect to the costs of power; he has shown himself singularly lacking in the application of engineering economies; and he has failed to supply data essential to the integrity of the claim of reporting in an "exhaustive and impartial" manner. In a word, it was charged that Mr. Murray had employed methods demonstrably reprehensible and unprofessional.

"This charge has now been substantiated by representative instances selected from the mass of such material to be found in the "Murray Report." The varied character and comprehensive range of the subjects specifically dealt with is well disclosed by glancing over the Table of Contents of this Refutation. "

Rural Power Lines

Construction of rural power lines by the Ontario Hydro-electric Power Commission was commenced in eleven townships in 1921 as follows: Nepean, West Flamboro, Saltfleet, Ancaster, Niagara, Howard, Beverley, North and South Dorchester, Yarmouth and Nottawasaga. Seven new low tension lines were constructed in various parts of the province. The total mileage of transmission lines built and acquired by the Commission up to October 31st, 1921, was 3,001.

Northern Canada Power Company

Gross earnings of the Northern Canada Power Company, for 1921, amounted to $344,483. Operating and administrative expenses totalled $85,668, leaving net earnings $457,815. As this is the first financial statement made public no comparisons are available. After the usual deductions, net profits remained of $84,431. The balance sheet shows total assets of $7,369,266, and liquid assets of $204,696. Current liabilities are shown as $76,578.

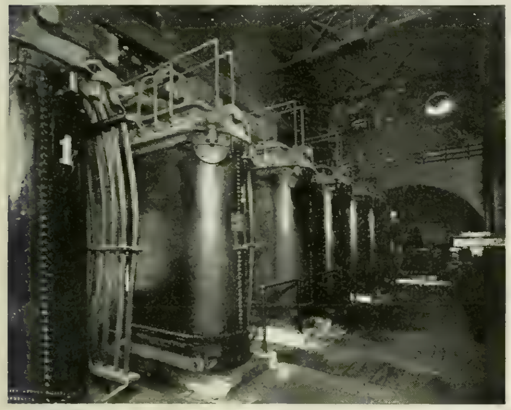
Mr. G. J. Mickler, Treasurer Association Municipal Electrical Utilities

The Application of Electricity in the Manufacturing Industry---6

Cement Plants Are Almost Entirely Driven by Electric Motors — Severe Conditions Require Rugged Construction — Adoption of Synchronous Motors and Magnetic Clutch

The manufacture of cement from its raw constituents involves a variety of crushing and grinding operations that readily lend themselves to the adoption of electric power. Certain clays and limestone are the raw material, and the crushing, grinding and calcining of these constitute the main processes of a mill.

Crushers, tube mills of various types and rotary kilns thus form the great bulk of the machinery, and it may be said that with the possible exception of the tube mill, they are not inherently difficult of adaptation to electric motor drive. Local conditions, however, are severe, due to the unavoidable prevalence of dust. Cement dust is very fine and abrasive and the atmosphere of a mill is heavily laden with it. Motor bearings are generally constructed with some special dust protector arrangement, but nevertheless there is heavy wear. In some cases the larger motors are run for as long as 12 months without rebabbitting, but this is exceptional.



Transformer Bank in a Cement Mill—Canada Cement Company

Frequent Inspection of Motors Necessary

It follows that frequent inspection is needed to prevent such troubles as would ensue if a rotor dropped far enough to touch the stator, and air gaps have to be frequently checked up. Such an inspection also corrects such matters as the collection of dust around the bearings themselves—a condition of affairs that would soon drain them of oil by capillary attraction.

Belt drive is necessary in many cases and unless the belts are tightened up much more than is usual, the dust causes slippage. This tightening of course aggravates the effect of any dust in the bearings. In this regard it may be pointed out that cast iron pulleys are used to a great extent, owing to the dust cutting up paper pulleys.

The advantages of electric motor drive, however, outweigh the troubles incidental thereto and the application of electricity in this industry has seen a gradual rise of individual motor power from a maximum of 75 to one of 600 h.p. or more. This change has been the result of the introduction of heavier mills and the demand for greater production.

It may be pointed out that alternating current is not exclusively used. There are several installations of direct current that do not give the commutator trouble that might be expected. The advantages of alternating current, however, such as its economy of transmission and cost have made it preferred by most operators.

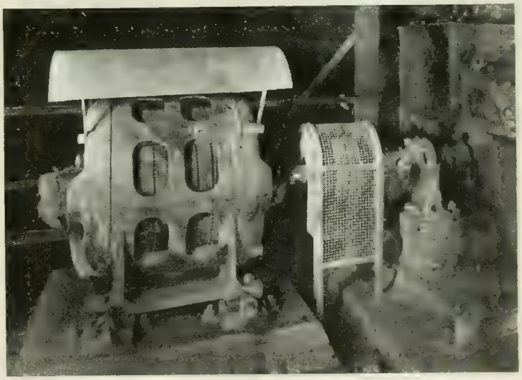
Types of Motor Used

The question as to what type of motor is best for certain operations, is not definitely settled. It is quite usual to find a mill where all the motors are of the squirrel cage type and then to find others where slip rings are used even in the smaller sizes. The tube mill is practically the only machine that has severe starting conditions, 120 to 130 per cent. normal torque being required for starting; this is an inherent characteristic, and somewhat prohibits the application of squirrel cage motors for the larger size. These are, however, quite commonly used for tube mill drive up to the limit of 200 horse-power; in these cases they are either started from a high voltage compensator tap, or thrown direct on the line with full voltage.

Slip Ring Motors

the rings are not materially worn by the dust and hence the

Slip ring motors are used mainly because of the possibility of speed variation, and because of their low starting current and small line disturbance. It has been found that the rings are not materially worn by the dust and hence the



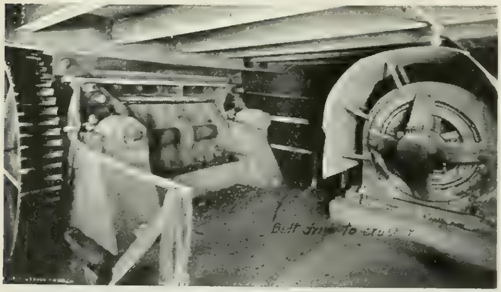
Motor Direct Connected to Swing Hammer Mill—
Canada Cement Company

use of the dust-proof enclosures is passing away. As mentioned before, frequent inspection is necessary for motors used in cement mills, and this inspection trip can serve as well for the cleaning of the dust from the air ducts, by compressed air, and blowing the rings clear.

The use of the compeb mill, which requires as high as 500 horse-power, has had a marked effect on the type of motor used in the cement industry. This mill is a constant speed load and the synchronous motor with its unity power-factor has been found to give a very satisfactory drive; since 1918 it has been gradually displacing the slip ring motors previously used for the purposes.

19 Induction Motors, each 175 H.P., 550 Volt, belted to tube mills. Canada Cement Co., Limited, Longue Pointe, Montreal.

The high starting torque requirement of the tube mill has been one of the difficulties in the way of a general adoption of synchronous motors, which cannot deliver 120 to 130 per cent. of normal torque during the starting period. This has been overcome by the use of magnetic clutches which allow the bringing of the mill lines up to speed after the motor is started light; this type of clutch has been developed since 1913, when it was first used in rubber mills.

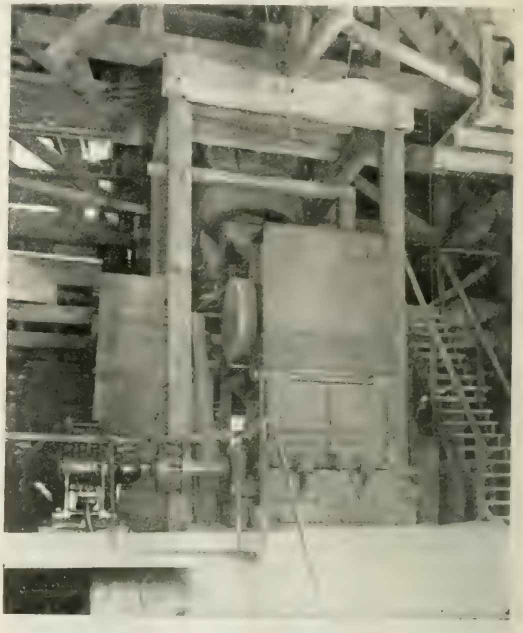


Motor Driving Crusher—Canada Cement Company

The clutch rating adopted should be that of the maximum developable power of the motor, thus a motor of normal h.p. 250, capable of developing 500 h.p. or over, should be equipped with a clutch of that rating.

As this type of clutch is operated by direct current, some source of this is required, and it is often supplied from the exciter generator for the synchronous motor.

The general appearance of the clutch is that of two annular plates, mounted in close proximity on the shaft connecting the mill and motor. One is an electro magnet carrying an annular coil, and it draws the other plate when the coil is energized. The member carrying the coil has a friction surface on the outer flange and the other member is extended to come into contact with this surface; positive clearance is provided when no current is flowing.



An Installation in Exshaw, Alberta—Canada Cement Company—Direct drive to Swing Hammer Mill

A peculiar feature of this arrangement is that as the large electro-magnet used in the clutch is highly inductive it requires up to six seconds for the clutch to reach its maximum torque. This allows of the taking up of all slack, and when the mill is started there is no shock. The clutch is often connected directly to the line with a knife switch, though some operators use a manually controlled rheostat. This is generally advised by the manufacturers, as synchronous motors with a low pull out factor are liable to be pulled out of step by a magnetic clutch connected directly to the line.

A Typical Plant

Cement plants of quite ordinary size are heavy power users. The motor equipment of one such plant is as follows:—

15 motors, 100 h.p. driving kominuters	1500 h.p.
19 motors, 175 h.p. driving tube mills	3325 h.p.
Group and individual drive on kilns	555 h.p.
16 motors, 100 h.p. driving pulverizers	1600 h.p.
Winch and pump motors, coal bridge motors, conveyor, belt motors, etc.	7000 h.p.
Total	14,080 h.p.

In this particular plant the majority of the motors are of the squirrel cage type and are belted to their drives. Direct current is used to some extent, at 600 volts, and is applied to the winch motors in the quarry, the water supply pumps, and the coal handling bridge.

Power House, Power-Factor Correction

Power is received at 10,000 volts, three phase, and is stepped down to 600 volts in the sub-station, which is equipped with six 2,000 kv.a. water-cooled transformers.

Power-factor correction is accomplshed with two synchronous condensers. Due to the large number of individual motors, a load-factor of 80 per cent. is about the average. The plant generally runs a 24 hour day, 7 day week and the larger motors are seldom shut down for more than a few minutes each week.

Motor Drive on Pulverizers—Canada Cement Company

Total Apparatus in Canada

At the present time there are 1,146 electric motors installed in cement plants in Canada; of these, 988 are alternating current, the remaining 158 being used in various situations where direct current is thought to be more suitable. Their combined horsepower amounts to 60,375.

These figures indicate a considerable consumption of current and apparatus, but it should be mentioned that they include only plants operating at the present time. It is safe to say that any considerable revival of business will result in a considerable swelling of the above totals.

Newfoundland Cable Taken Over

The direct United States cable from Ballingskellings, Ireland, to Harbor Grace (Nfld) and Halifax was taken over recently by the Imperial Cable from the Western Union Cable Company. The British Government purchased the cable in November, 1920, for £750,000 but it had remained under Western Union control by lease.

The cable taken over was laid in 1874 and was the first transatlantic cable to use the Dr. Muirhead system of duplex. Its first Nova Scotia landing place was at Torbay, Guysboro' county, but it was moved to Halifax in 1887

The Government's Conversion Scheme

The attention of the holders of the five and a half per cent war loan bonds maturing December 1, 1922, is directed to the offer of the Minister of Finance to renew the loan. The last Canadian loan was placed in New York but the Minister is making his present financial operation entirely a domestic one by offering to accept the maturing bonds in exchange for new bonds bearing the same rate of interest, running for either five years or ten years as the bondholder may prefer. A further inducement to the investor is that he receives a bonus of one month's interest. The only difference is that the new loan is not tax free. The terms offered are favorable to the investor and doubtless a large part of the maturing loan will be renewed. Arrangements for the exchange of the bonds can be made at any branch of any chartered bank Holders who do not wish to reinvest will be paid in cash on the 1st December.

Equipment for French Railroad Electricification

Equipment for the electrification of another section of the French Midi Railways has just been shipped from its East Pittsburgh plant by the Westinghouse Elec. & Mfg. Company. The lines of the Midi Railways are mostly located in the South of France north of the Pyrenees. As far back as 1906 the management of the railways commenced an exhaustive study of the electrification of this part of their system, having in mind the utilization of the water power available on the northern slopes of the Pyrenees. By 1914 four sections had been electrified with single phase current at 12,000 volt and 16.67 cycles, but all work was stopped at the outbreak of the war.

The French, early in the war lost practically all their coal fields to the Germans. This emphasized the necessity of developing the water power resources of the country and electrifying the railroads wherever it could be economically done. Thus on the cessation of hostilities one of the first acts

The commission, after visiting, Italy and America. re-
abroad to study existing railway systems.
of the Governmen- was to send a technical commission
commended that 1,500 volts, direct current, be adopted as the standard for the electrification of all French railroads, and the Midi Railways Company, in conformity with this decision, immediately resumed the work interrupted by the war on this new basis. The sections already electrified at 12,000 volts will be changed to 1,500 volts direct current, so as to have a uniform system throughout.

Transmit Power at 150 kv.

The power will be generated in six stations or groups of stations capable of developing a total 362,000 h.p. the stations being put up progressively as the different sections are electrified. The head of water varies from 350 feet in the station with the lowest head to a maximum of 2,500 feet. Power is generated at 8,000 volts and 50 cycles, and is distributed to the railway sub-stations over a 60,000 volt three phase distribution system, distant points of the distribution system being connected by 150,000 volt transmission lines.

The railway sub-stations, which are located along the railroad at intervals of 12 to 18 miles, are connected directly to the 60,000 volt distribution system. They all contain rotary converters with the exception of a few in which mercury are rectifiers will be used.

The equipment for the generator stations, the distribution system, the railway sub-stations and the locomotives will be built in France. The work entrusted to the Westinghouse Company comprises a large part of the 150,000 volt transmission system, including the transformers, synchronous phast-modifiers for the voltage control, and the relay protective gear.

Electrical equipment for pumping oil wells is described in considerable detail in a publication, known as Leaflet No. 1134, which has recently been issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa.

Electrical Exports and Imports

Speaking at Toronto before the Export Club, Mr. Lloyd Harris, until about two years ago head of the Canadian Trade Mission in London, gave it as his opinion that unless conditions greatly altered he did not think Canadian manufacturers had much opportunity of securing European trade for some years to come. At the same time, he thought there were still other fields open for the produce of Canada in the newer and undeveloped countries which are already buying.

Commerce Within the British Empire

The present, however, is an opportune time for increasing the flow of commerce within the circle of the British Empire. The United States has virtually shut out Canadian farm products and compelled Canadian farmers to cultivate the British market more extensively. At the same time Canadians are more than ever disposed to give preference to British over other imported commodities. British manufacturers have a unique opportunity, but they must pay more special attention to Canadian needs and conditions than in the past if they are to profit fully by it. The drive for Empire trade which is being organized in Great Britain will find a cordial response in this country, and, while the revival of Continental Europe may be essential to a complete return of British activity, a good deal of industrial slack in the old land may be taken up by a more vigorous attempt to realize the possibilities of trade under the British flag.

An examination of Canadian Import and Export figures for electrical goods as recently published, reveals some interesting facts.

It will be seen that imports are more than ten times as great as exports, proof positive that the Canadian field is full of opportunity for the home manufacturer.

Imports of Electrical Goods

Articles and Countries from which Imported.		Month of June 1921	Month of June 1922	Three Months Ending June 1920	Three Months Ending June 1921	Three Months Ending June 1922
Total Electric Apparatus, n.o.p., Lamps and Fixtures—						
From United Kingdom	$	36,519	27,738	107,649	120,640	73,957
United States	$	894,568	962,271	4,442 293	2,929,210	2,568,186
Other countries	$	29,383	37,084	63,169	72,969	115,093
Total	$	951,470	1,027,093	4,613,111	3,122,819	2,757 236

Exports of Electrical Goods

Articles and Countries to which Exported.		Month of June 1921	Month of June 1922	Three Months Ending June 1920	Three Months Ending June 1921	Three Months Ending June 1922
Total Electric Apparatus—						
To United Kingdom	$	1,651	73,032	33,523	13,170	146,212
United States	$	16,129	3,246	37,977	25,480	10,528
Other countries	$	25,610	65,867	34,204	92,474	105,832
Total	$	43,390	142,145	105,704	131,124	262,572

Meter Reading and Goodwill

"With others of my acquaintance," says a writer in Printer's Ink, "I have always harbored more or less animosity for the local public utility outfit, the gas company, the water works, etc.

"Then—then the awakening of conscience. My wife has been away vacationing for two months. I have had to prepare doubtful dishes and keep house. But I am absent during the day—just when, presumably, the reader of the meter from the electric light and power company calls on his rounds. At last came a letter—a courteous, altogether likable bit of correspondence. Could anyone entertain ill feelings after this:

> Our meter reader called at your premises on the 14th inst. but was unable to obtain the index. We appreciate the desirability of our customers receiving their bills promptly each month, and will be pleased to render a bill for the last period if you will kindly enter on the enclosed card the position of the hands of the meter, together with the date they were in the position indicated, the reading thus obtained can be verified later. We thank you for your co-operation in this matter and enclose a stamped-addressed envelope for the return card.

"In other words, you read your own meter."

600,000 Volt Transmission Line Constructed

An experimental transmission line for operation at 600,000 volts, the highest voltage line in the world has recently been completed at Purdue University, Lafayette, Indiana. At the present time very little is known about the phenomena of high tension transmission in excess of 220,000 volts, so the engineering experimental station of Purdue has begun work to obtain definite data. The new transmission line is based on the design by Ross Lake but was modified considerably by Prof. C. T. Harding, head of the Electrical School. The line is 1,700 feet in length and consists of three 600 foot spans of steel core aluminum cable, supported on four steel towers 65 feet high. The cross arms are 40 feet long, and the 15 unit suspension insulators are hung in such a manner so that they may be readily moved in different directions from 16 to 40 feet without taking down the cables. The conductors were donated by the Aluminum Co. of America and there is enough wire available for the complete equipping of the line in five different sizes. The voltage is controlled by means of an auxiliary transformer and double drum motor driven controller which provides 480 equal steps without distortion of the wave form.

Annual Report of Montreal Tramways Shows a Surplus

For the first time since the tramways commission was appointed four years ago the Montreal Tramways Company shows a surplus in its annual report, which was issued recently. Gross receipts show an excess of $187,947.51 over expenditures and this the report points out is in face of the fact that there were fewer passengers carried than last year. The surplus is attributable to lower operating expenses even though revenues were considerably less, the commission states.

Electrical Events at Western Points

J. G. Kerry Chosen Consulting Engineer

J. G. Kerry, of Toronto, has been chosen by a special Committee of the City Council for the position of consulting engineer for Vancouver's proposed hydro-electric enterprise. Mr. Kerry, if the committee's choice is confirmed by the City Council will be asked to investigate and report on sites that might be available for hydro-electric purposes adjacent to the city.

B. C. E. R. Co. Working at Stave Lake

At the Stave Lake Plant of the British Columbia Electric Railway Company, they have under way considerable work, employing some 200 men. They are raising the present dam, removing the old spillway and building a new one at the Blind Slough. In addition to this, they are installing a fourth generator of 13,000 horse-power capacity, thereby bringing the plant up to 52,000 horse-power. The power-house will be extended correspondingly.

Winnipeg Notes

The Winnipeg Hydro report hat the sale of appliances has been very good during the past month or two. They are averaging about seventy sales a month of electric ranges; they also find the demand for smaller appliances better than anticipated.

* * *

Fort Rouge telephone exchange will be in operation on the automatic system in January next and the change-over at St. John will probably take place in April, J. E. Lowry, chief commissioner, Manitoba Government Telephones, stated recently.

Most of the automatic apparatus for the Fort Rouge exchange, which is being supplied by the Northern Electric company, has been delivered and a considerable portion installed.

Two-thirds of the Winnipeg system will be automatic when the 7,000 lines on the Fort Rouge exchange and the 6,300 on the St. John cease working on the manual system. That the Garry exchange, with its 13,000 lines, is probably the largest single exchange in Canada, either manual or automatic, is not generally known, the commissioner remarked. With a two-years' experience of this exchange as an automatic, he was able to say that the changing from manual to automatic, which will eventually cover the whole system, will tend towards a reduction in operating costs and an improvement in the service. Commenting on the satisfactory working of the existing automatic system, he said that, like any delicate apparatus, it required a high standard of attention and maintenance, but, given these, it was the best and quickest service there was today.

* * *

Can. Allis-Chambers Ltd., have been awarded the contract for ornamental lamp standards over the Osborne Street Bridge by the city of Winnipeg.

Diesel Plant at Ft. Saskatchewan

The Provincial Government of Saskatchewan will install an electric plant with Diesel engine at the Provincial Jail in Fort Saskatchewan. This installation will improve the lighting and power supply of the town, which obtains its electric supply entirely from the government source.

Calgary Recognizes Organization

The most enthusiastic assembly of the electrical fraternity ever held in Calgary met over dinner in the Elizabethan Rooms of the Hudson's Bay Company, on the evening of August 8th, in the interests of electrical development and organization. The meeting, which was attended by some seventy members with R. A. Brown, city electrical engineer in the chair, was arranged at the instance of the local electrical jobbers and was addressed by Kenneth A. McIntyre of the Society for Electrical Development, and Laurence W. Davis of the National Association of Electrical Contractors and Dealers. In his solicitation for members to the Association, Mr. Davis met with 100 per cent. response from the electrical contractors and dealers. Quite a number present, also, not privileged to full membership, enrolled themselves as associate members. A local representative body was immediately formed, the executives being: G. M. Wilkinson, Cunningham Electric Company, Limited; J. J. Cassidy, Crane-Cassidy Electric Company, Limited, and G. M. Morton, Electrical Engineers, Limited. An early meeting of all members is being arranged.

Good luck Calgary, Carry on!

Activity Among Western Electrical Contractors

S. O. Bell, electrical contractor and dealer, North Battleford, Sask., has been awarded the contract for wiring 5 stores for H. R. Bowers, hardware dealer, North Battleford Sask.

* * *

The P. A. Electric, Prince Albert, Sask., were recently awarded the contract for wiring and for lighting fixtures, of the Union Trading Store, Central Ave.. and River Street, Prince Albert. The work is being carried out in conduit. The fixtures installed were all 12 by 8 white lume balls, chain hangers.

* * *

Mr. H. W. Davy, electrical dealer & contractor, Prince Albert, Sask., has been awarded the contract for wiring and lighting fixtures, for 7 stores, on Central Ave., Prince Albert, Sask.

* * *

The Electric Shop, Ltd., Saskatoon, Sask., have been awarded the contract for the Presbyterian College. Saskatoon, to instal wiring, switchboard and lighting fixtures.

* * *

The Electric Shop, Ltd., Saskatoon, Sask., have been awarded the contract by the Saskatoon Hardware Co., Saskatoon, to instal wiring and lighting fixtures in their new building.

* * *

The Wheaton Electric Co., Ltd., Saskatoon, Sask., have been awarded the contract for the Scott Dairy Co., Ltd., Saskatoon, to instal the wiring, switchboard, and lighting fixtures, at an estimated cost of $1,550.

* * *

The Wheaton Electric Co., Ltd., Saskatoon, Sask., have been awarded the contract for the new Chemistry building, University of Saskatchewan, Saskatoon, to instal wiring, switchboard, underground cable, and lighting fixtures at an estimated cost of $21,000.

The Canadian Radio Field

Radio Exhibition Will be Held at Toronto

During the last two days of the Canadian National Exhibition, Sept. 8 and 9, a gathering of radio enthusiasts, manufacturers, jobbers and dealers will be held at the Prince George Hotel, Toronto. It is stated that there will be on hand a variety of radio apparatus for their inspection, and that an interesting programme, including a banquet and lectures by prominent men in the radio field, has been arranged. As the first thing of its kind, this radio show should prove interesting to all concerned in wireless matters.

"Ether Pocket" in Canada

There is an "ether pocket" somewhere in the Lake of Bays district, in the opinion of engineers of the Canadian Independent Telephone Company. The first intimation of the Lake of Bays pocket came with the discovery that none of the big broadcasting centres, could be heard at Bigwin Inn, although the apparatus there installed would have ensured, under normal conditions, the reception of programs from anywhere within a radius of 500 miles.

Exhaustive experiments were made. The Canadian Independent Telephone Company took up the matter, and sent engineers up to personally operate the receiving equipment at the summer resort. Tests were broadcasted, under varying atmospheric conditions. Some of the tests were made during the day time, and others were conducted as late as midnight. In no case did the transmission reach Bigwin Inn satisfactorily. Even comparatively near wireless stations on Lake Ontario were practically inaudible.

The first theory was that there was a big mineral deposit somewhere between Toronto and Lake of Bays, that attracted the radio waves and grounded them. But this theory did not hold when it was found that transmission coming from any direction was affected in the same way as that from Toronto. There is hardly likely to be a mineral deposit large enough to extend in every direction in which signals were coming. "It is evident," says General Manager MacKay, of the Telephone Company, "that this particular place is one of those localities to which, for some reason unknown, radio signals are transmitted with extreme difficulty. That such places exist is well known in the radio art, and, strange to say, several such locations are known on the ocean as well as on land."

Radio Tells Surveyor His Real Position

The National Resources Intelligence Branch of the Dominion Department of the Interior is using radio for surveying work. The Department has issued the following statement in regard to this innovation:

What radio can do as an entertainer and as a means of transmitting messages and news is fairly well known, but perhaps the immense service it can render in making certain kinds of work more efficient and valuable is not realized. An example of this is the work being done by the Topographical Survey Branch of the Department of the Interior in the Mackenzie River district, where the recent activity in the development of the oil fields and mineral claims has brought with it a demand for accurate surveys far away from the existing surveys of Dominion lands. Surveyors employed on these surveys are carrying with them as part of their equipment small radio receiving sets. The music that will interest them most will be a few faint ticks which represent something of great importance to a surveyor—correct time.

When the radio fan hears the time signal come through at the close of the evening's broadcast program, he checks up his watch so that he can be on time in the morning. Things are otherwise on the Mackenzie. In the surveyor's camp there are much more important uses for time. He can use it in his work for a variety of purposes, one of which is to find his true longitude, or east-and-west position.

He is able to get his local time very accurately by taking observations of the stars with his surveying instruments. After he has done this, let us suppose that, while listening in with his radio set, he receives a time signal from Ottawa. He finds that the time in Ottawa is exactly so many hours, minutes and seconds faster than his local time. By means of a few calculations, he changes time into distance, and the result tells him just how far west of Ottawa he is. In actual practice the surveyor does not have to depend on time signals from Ottawa, but is able to get them daily from a number of high powered stations in various parts of the world and he calculates his longitude from Greenwich instead of from Ottawa.

Is Most Accurate

Various other means of finding the longitude of a place have been used by explorers and navigators, but the use of time signals was the only way easy and accurate. Where the tlepraph was available, the signals could be sent by wire, but elsewhere less reliable methods had to be used.

With the long arm of the radio time signal, the Topographical Surveys Branch expects to be able to reach out far beyond the end of the longest telegraph wire, and locate the correct position of any point with a probable error less than the length of an ordinary city block; in fact the Dominion Observatory, by using instruments more elaborate than those used in surveying, has determined longitudes which are estimated to have a probable error about equal to the width of a street.

Radio at Canadian National Exhibition

A demonstration of radio is included as one of the new features of the National Exhibition at Toronto, Ont. The programme laid out embraces a continuous eight-hour programme by wireless telephone, an explanatory motion picture, operations by a travelling radio station and the distribution of helpful literature to radio amateurs.

Headquarters of the demonstration are in the Radio Building which is located on the grounds to the southwest of the Government Building. This building is divided into two auditoriums, one, the concert hall, and the other the motion picture theatre. The continuous programme heard in the concert hall includes news bulletins, a complete sporting service with scores from the three big leagues, addresses by prominent visitors, weather forecasts, fashion talks and special features.

In the theatre half of the radio building is shown Canada's first motion picture study of radio operations. The film portrays both broadcasting and receiving stations and gives an explanatory sketch of radio's development. An additional feature will be the broadcasting of addresses from the director's daily luncheons in the administration building These addresses will go back by microphone and direct wire and thence be broadcasted by wireless telephone as part of the daily programme. It will mark the first attempt at such operation in Canada.

Radio Versus the Wired Telephone

At the present time radio telephony is, to the great majority of people, essentially a device for amusement. The opinion is generally held, that its adaptation to the everyday uses of communication is but a step and that communication by this means will soon be possible with the same ease as with ordinary telephony.

Those actually engaged in wireless work are not so optimistic. The difficulties that stand in the way are more apparent to them, and as a consequence their opinions are more conservative. The whole question has been taken up in England by the Radio Research Board, and an investigation made of which a report has just been published.

The sub-committee which carried on the investigation, consisted of Admiral Sir H. B. Jackson (chairman), Prof. C. L. Fortescue, Prof. G. W. O. Howe and Major A. G. Lee, held eight meetings, at which witnesses from Marconi's Wireless Telegraph Company, the Radio Communication Company and the fighting services were examined.

Findings of the Committee

The conclusions arrived at are summarized below:—

(a) The development of radio telephony for long ranges is in an extremely elementary stage, and no line of development which would be likely to lead to its establishment on a commercial basis within a measurable period is visible.

(b) For ranges of the order of 1,000 miles in certain remote localities, where the interference from atmospherics and other radio communications is not excessive, it would be possible to establish non-secret radio telephonic services using waves of the length usually employed by medium power radio telegraph stations communicating over the same range. The power necessary for radio telephony, however, would be much greater than that required for satisfactory communication by radio telegraphy over the same distance.

(c) For ranges of the order of 200 miles, the position is more hopeful, and the lines of experiment which are being followed will lead to the development in a reasonable time of a system of radio telephony which will approach approximately at any rate to the requirements of a commercial system.

(d) The use of radio telephony as a substitute for any other means of telegraphic communication cannot be recommended except in those cases where the special requirements can be met in no other economic way—for example, the broadcasting of intelligence of general information where one costly transmitting station supplies a great number of simple, inexpensive receiving stations, seems a practical commercial problem, especially in localities ill-equipped with land lines.

Telephone Inferior to Telegraph

All the witnesses examined agreed that for the transmission of a specific message over any distance—long or short—the radio telephone was greatly inferior to the radio telegraph in accuracy, speed and cost, and was likely to remain so. They agreed also that the articulation of the best radio telephone installation known to them compared favorably with that over a trunk land line, but that it was necessary to repeat or spell unusual words or proper names and repeat figures. The Sub-Committee consider, therefore, that the spheres of utility of the two systems are as separate and clearly defined as those of land line telephony and telegraphy.

Sufficient Power Must be Used

It is pointed out that for successful operation a radio telephone installation must satisfy the same requirements as a land line system. It must give at least as good articulation, and sufficient power must be used to overcome all interference from other signalling or from atmospherics. At the same time this power must not be so large that running and maintenance costs are excessive. The interference of atmospherics is very variable both in respect of locality and season, and in certain localities communications may be interrupted from this cause for hours or days, even when very high transmitting powers are used. Further, some degree of secrecy must be provided. The ideal, of course, is absolute secrecy; but a service might be considered commerciallly possible if the interception of a conversation required costly and elaborate apparatus needing skilled adjustment.

Lack of Secrecy

In the Sub-Committee's opinion the possibility of establishing satisfactory radio telephone communication on a commercial basis over long distances—3,000 miles or more—is remote. Witnesses variously estimated the powers necessary for such services to be from three to twenty times greater than those at present considered necessary for similar radio telegraph services over the same ranges. The necessary charge for a conversation would accordingly reach an impracticable figure. No means are at present known by which any appreciable secrecy can be obtained for a conversation taking place at such a range. The interference with other radio communications would be greater than that due to two radio telegraph stations communicating over the same distance on the continuous wave system, owing largely to the increased power. Radio telephone communication would be exposed to atmospheric interference, and the interference of other radio stations, to a greater extent than radio telegraph communication over the same distance. For medium ranges the Sub-Committee consider that the difficulties as regards a commercial service are practically the same as those for long distances.

Conditions of a Commercial Service

The Sub-Committee consider that the conditions requisite for a commercial service can be met at the present time in the case of a service over a short range to the following extent:

(a) The articulation is approximately as good as on land lines of similar length.

(b) It seems probable that a full twenty-four hour's service could be maintained in most localities.

(c) Atmospheric disturbances and, under present conditions, interference by and with other stations are very much less troublesome on the short waves used, so that delays of traffic through these causes are less probable, and the power required is not excessive.

(d) Unauthorized reception is made more difficult by the use of short waves, but conversations can be picked up by special apparatus. In the case of very short waves, the transmission can be made to some extent directive—i.e., the waves can be made stronger at points on the line joining the transmitter and receiver than at points off that line, thus reducing the area over which interception is possible. In any system, irrespective of distance, the use of different wave-lengths for transmission and reception at a given station makes it more difficult for one person to overhear the whole of a conversation.

(e) There are no insuperable difficulties in the system being worked satisfactorily in connection with the ordinary trunk lines, and, as far as subscribers are concerned, the conversation can take place exactly as with the land line system—i.e., the subscriber has not to instal in his office any special apparatus or to manipulate any switches during a conversation.

Wireless Notes from Everywhere

Near the Pole

The most northerly wireless station on the globe is probably at the village of Noorvik, just inside the Arctic Circle, with a population of 350 Eskimos.

4,000 Vacuum Tube Sets

In Toronto there are said to be now between three and four thousand vacuum tube receiving sets. This estimate is made by certain officers of the Wireless Association of Ontario, based on some facts which they have.

New Stations in Gambia, West Africa

The British annual Colonial report for Gambia notes the completion of wireless telegraph and telephone stations in that colony at Bathurst and at McCarthy Island, distant 176 miles. These stations are intended for internal communication, as the colony has no organized telegraphic wire system.

Big Radio for Poland

The building of one of the most powerful radio stations in the world, which the Polish government has undertaken in Warsaw in co-operation with the Radio Corporation of America, is advancing successfully. According to an announcement in the Warsaw press, this station will be working by October of this year.

To-day's Equipment Obsolete in 10 Years

An invention likely to cause a revolutionary change in wireless long-distance work has been made by Dr. Irving Langmuir, the world-famous physicist. Senatore Marconi recently paid a visit to Dr. Langmuir's laboratory to see it at work. It is a simple tube for the generation of powerful wireless currents, and its possibilities are such that it may "scrap every big plant in existence when fully developed." Mr. Marconi has himself recently predicted that to-day's equipment will be obsolete ten years hence.

Weather Reports by Wireless in France

The Eiffel Tower radio station at Paris is preparing to send out telegraphic weather reports and forecasts three times daily. A suggestion has been made that radio receiving sets be installed at central points in the various country communes and that the information thus received be signaled to the farmers by a code of sound signals from the church bells. For example, no signal if no change in the weather forecast; 3 strokes of the bell if rain is expected; 6 strokes for frost; and 10 strokes for wind or hail storms.

Belgian High-Power Station

Work is in progress on the first large radio station for international traffic in Belgium. Up to the present time the Belgian wireless service has been limited to reception from the high-power stations of other countries and distribution to points in Europe via land wire. The fact that the circuit was available only to traffic in one direction has prevented the development of the service. The completion of this new station at Bruges will make it possible to handle a considerable volume of the foreign communications of Belgium by radio.

M. Charbonelle, the Belgian telegraph engineer, is experimenting with a high-speed transmission of written messages, the received message appearing in actual long hand equivalent to a photograph of the original written message filed at the transmitting station.

Time Signals

One of the most remarkable developments in wireless broad-casting is the extensive transmission of time signals. Started in 1909 by the Eiffel Tower, the sending of time signals is now a feature of over forty of the world's chief wireless stations. They are sent out on widely varying wave-lengths and systems. The familiar time signals of the Eiffel Tower make it easy with a little practice to register the correct time to within a half to a quarter of a second.

Impulses Amplified 100,000 Times

A remarkable new receiving apparatus, invented by Major E. H. Armstrong, is stated to amplify wireless impulses more than a hundred thousand times, and to be many hundreds of times more sensitive than the best heterodyne receiver. It has been recently described at the American Institute of Radio Engineers, and has caused intense interest. Much depends upon the evolution of the receiving apparatus in long-distance wireless; the more sensitive that it can be made, the less power will be required for transmission.

Automatic Recording of Wireless Messages

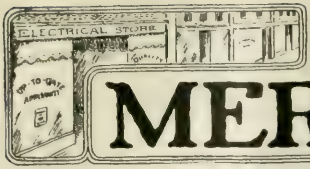
Further progress has been made in the automatic recording of wireless messages, in the shape of a new apparatus which allows of two messages of nearly equal wave-length being simultaneously registered in the operator's absence. Despite the sensitiveness of the device—which is the work of Mr. F. W. Dunmore, of the American Bureau of Standards—it can be used to record messages on an aeroplane, being proof against vibration.

From Moscow to Berlin

A method of wireless telephony that has been used between Moscow and Berlin (over 1,000 miles) with success and is stated to give remarkable true rendering of the human voice is known as the Pungs-Gerth system. Its chief feature is the novel way in which the microphone currents are made to influence the currents radiated from the antenna by a new magnetic device giving great purity of tone and distinct speech reproduction.

An English Radio Concert

English newspapers are beginning to give wireless concerts. One of the receiving stations arranged for a Daily Mail wireless concert from The Hague was at the offices of a well-known London electrical firm. On the appointed evening a large audience had assembled before the scheduled time. Seven o'clock arrived, but the loud-speaking apparatus which had been set up remained dumb, and it was apparent that something was wrong. Whether it was the inadequacy of the transmitting power which was small or that the atmospherics and Croydon were to blame, the fact remains that a large crowd was disappointed. An attempt to mitigate their chagrin was made by the running over of a few gramophone records, and, later, by a wireless concert from a nearer source. The first was rather nerve-racking, and the second was reminiscent of the earliest phonographs. It is only fair to say that in several places The Hague concert was received—these places being chiefly upon the East Coast. It is evident that the art has been more highly developed in the Canadian fields.



BETTER MERCHANDISING

Contractors Too

A prominent central station man stated in conversation the other day:

"This coal situation is not only a wonderful opportunity for the manufacturers and dealers in electrical heating equipment but the contractor can reap a harvest too if he is wide awake. House holders are intensely interested in securing some form of heat for the early winter, and expense, in many cases, will not be a prime factor. If contractors will first explain to the householder the merits of electric heating as an auxiliary to coal, they will easily convince him of the wisdom of having his house re-wired. It is the Contractors' Harvest time as well as the Dealers'!"

We believe this is sound reasoning.

The trouble with both our electrical contractors and our electric merchants is that **they don't go after business.** They wait around for it to come along. Experience has proven, however, that the "go-getters" are the successes. Right now the harvest is golden ripe. If you have never tried it before **get out to-morrow and look for business.**

Mrs. Byer Tells How a Real Contractor Beat a Cut-throat Competitor

A Case Where Service and Square Dealing Meant More to the Customer than Mere Cheapness — Note the Completeness of Ben Socket's Estimate

Editor Electrical News.

I thank you for printing my first letter.

My intention was to write you this time about some of my own experiences in dealing with the electrical contractor-dealers while intending to buy certain electrical appliances and to have some small matters attended to in our home; I have decided however, to postpone it for another letter.

The other night Ben Socket came in all pepped up, as my husband expressed it. He landed a job by trying real business methods. I hasten to send his story to you, believing that it will make interesting reading to your subscribers. There were, however, so many trade details in connection with it, that my husband asked Ben to write it down for me; I hope you will know where they belong to and will put them in the right place.

Mr. Prospect Asked A Price

A short time ago a man, whom I shall call Mr. Prospect, came into Ben's place of business asking for a price on electrical installations in a house he had under construction for his own home.

Mr. Prospect had visited, some time previous, what he called a modern electrical home, and both he and his wife had decided to have a fully modern home, which they were told was a house properly and adequately wired for light, heat and power.

As it happened, Ben had had something to do with that electrical home, and on one or two occasions was showing the visitors around explaining to them the electrical equipment.

The house Mr. Prospect was building had a basement, which they intended to use for a laundry, a hall, living,dining rooms and a kitchen on the ground floor and two bedrooms, a nursery and a den on the floor above. Ben secured the plans of wiring details of the electrical home, and advised his prospective client that to have the house wired to provide proper electrical arrangements it would require 33 light outlets, 24 convenience outlets, of which 7 would be of what he called "duplex" type, and 21 switches. He offered to do this work for $238.41, and was just waiting to hear: "All right, Mr. Socket, you may start on it as soon as the house is ready to be wired." Instead, however, he was told neither yes or no, but promised an answer, shortly, by telephone.

Socket checked his figures again

A few days later Socket went to enquire about the job, but there was no reply for him as yet. The same afternoon he was telephoned to by Mr. Prospect and asked if he would undertake the work for $175.00 with the usual, "I would rather give this work to you than to anybody else, for several reasons, but your price seems to be unreasonably high."

Socket this time took a course that any sensible business man should take; he checked over his figures again and informed his client that he could not do this work the way Mr. Prospect would like to have it done and according to the standards of respectable contracting for any less than he had quoted. He pointed out that his work must be done by men who are properly skilled and who have to be paid a fair living wage; he has to put in the necessary amount of material to do the job right and of a quality this kind of work requires; that any work he does must cover his overhead expense and that he certainly must get some profit out of the work as otherwise he could not exist in business. He advised Mr. Prospect that he was quite prepared to show him his estimating sheets and to explain every item, to satisfy him that the work is worth the amount asked.

Ben Socket was determined to get that job; he knew well that it depended on good salesmanship whether he got it or not at the figure he quoted. Armed with his estimating sheets and a few samples of the kind of supplies he intended to use, also some of inferior quality, he went to see Mr. Prospect. On his way he met Plug, who was also tendering on the same job, and whose original tender was almost the same as Socket's. Plug had succumbed to his usual habit of meeting the price of his competitor no matter what loss it might entail to him and accepting work at the client's own price and this time he made some money by not losing any —because he did not get the job.

Socket found that Mr. Prospect was quite open minded when he submitted his reasons for asking the price he did but, like most people he wanted to be shown. He told Ben, that after he spoke to him for the first time he had asked Plug to figure on the same job and that Plug's tender was $230.00. In conversation with a friend, however, he had mentioned that he intended to have his house wired the same way the electrical home was wired and his friend had recommended what he called a splendid and cheap electrician, who does such work very reasonably.

As a result, Curbstone, the splendid and cheap electrician was asked to put in his tender, which he did at $175.00.

"Being anxious to find out how you fellows are calculating your work, I have asked Curbstone to submit to me in detail, cost of his material and price for work," said Prospect to Ben," and here you can see it for yourself."

Curbstone's tender was as follows:

93 Outlets	.80	$74.40
4 3/W Flush Switches	1.10	4.40
17 S.P Flush Switches	.80	13.60
24 Flush Base Receptacles	.90	21.60
1 Flush Floor Plug		3.50
1 Bell Ringing Transformer		1.75
1 4 Drop Annunciator		17.00
1 Comb. Floor Push		1.75
1 Buzzer		.75
2 Push Buttons	.65	1.30
1 Stove Main & Special circuits		20.00
1 Panel Board Steel Box circuits		15.00
		$175.05

Switch Receptacles

	Circuit	Light Outlets	Switches S. P.	Switches 3/W	Recpt.	Flr. Pl.	Transf.
Basement	8	6	1		1		
Grd. Floor		12	8	2	9	2	1
1st Floor		12	6	2	10		
Garage		3	2		4		
TOTAL	8	33	17	4	24	2	1
Plus 3/W Sw.		2					
Plus Mains		2					

"I asked you if you would meet that price which you have refused—and Plug, asked the same question, after a little hesitation said he would. I would like to know why you persist in asking such a high price for that work and how you arrive at it."

Socket felt that this was the time to play his strong hand and pulled out his estimate showing not 93 outlets at 80 cents per outlet, but an exact statement of every bit of material used, the amount of time necessary to do this work, 25% for overhead expense, which must be covered, and a reasonable profit of 15%.

This was his calculation:

Quantity	Item	Price	Total	Time
1653 ft.	No. 14 R.C. S.B. Wire,	7.76M.	12.83	
185 ft.	Circuit Loom,	15.00M.	2.78	
460	5-1/2" Split Knobs	15.00M.	6.90	36
370	3" Tubes, (Porc.)	7.20M.	2.56	
100	4" Porc. Tubes,	8.40M.	.84	
	Leatherheads & Nails,	.45	.45	
45	Switch & Plug Outlet Boxes,	11.50C.	5.18	8
2	Floor Receptacles	2.61	5.22	1
7	D. X. Base Receptacles	.80	5.60	2
17	S.P. Fl. Switches	.42	7.18	2
17	Base Receptacles	.47	7.99	4–1/2
4	S/W Switches	.54	2.16	
1	Bell Ringing Transformer		1.10	2
1	Buzzer,	.65	.65	1/2
1	Annunciator (White Enamel) 4th N.K. Trimming	12.42	12.42	1
2	Push Buttons	.75	1.50	
1	Comb Floor Push Button		.98	1/2
1	Residence Panel 8 circuit		23.40	4
3 ft.	1-1/4 Conduit	.20	.60	1
1 ft.	1-1/4 Condulet	1.68	1.68	1
1	60A. 250V. 2P. S.T. Safety Switch		5.60	2
16	10 Amp. Fuse Plugs	.03–1/2	.56	
4	60 Amp. 250V. Cart Fuses	09	.36	
15 ft.	1" Conduit		2.10	2
1	"E" Condulet, 1"	.59	.59	1/2
14 ft.	No. 2 R.C. D.B. 1"	75.25M.	1.06	1/2
35 ft.	No. 6 R.C. D.B. Standard	39.09M.	1.37	1
2	No. 1 Ground Clamps	.10	.29	1
	Locknuts, Bushings Tape, &c.		1.50	
	Inspection,		6.00	
	Total		121.36	77
	Tax 2-1/4%		2.73	
			124.09	
	Time 77 hours at .60		46.20	
			170.29	
	Plus 40 per cent overhead and profit		68.12	
			238.41	

Outlet Distribution

	Bkts.	Centres	Switches S.P.	Switches 3/W	Recept.	D.X. Recept.	Fl. Plg.	Bell Transf.
Basement		6	1			1		
Grd. Floor	2	10	8	2	8	1	2	1
1st Floor	2	10	6	2	5	5		
Garage		3	2		4			
Total	4	29	17	4	17	7	2	1

Socket and Prospect went over every detail of the estimate. Ben explained to him the advantage of having work done by a reputable contractor, whose business standing in the community is the guarantee of his work. He pointed out that although the actual cost to him of some of the supplies is lower than quoted by Curbstone, his quality is superior. He was able to make Prospect see by his argument that to have an electrical installation properly done is not an expense but an investment. As to Curbstone's tender, Socket pointed out that he knows of an electrical contractor, or at least so-called contractor, by name Carpetbagger, who would probably undertake this work for $156.45 or if pressed for 155.00.

"But," asked Socket, "why do you prefer, Mr. Prospect, a dollar to the German mark?

"Because, you know our dollars are good and you can bank on them; because you know that they are what they represent."

Socket walked out from Prospect with an order to wire his house for $238.41 and an undertaking to let him know how much fixtures would cost for that house.

It was not the few dollars Socket was making out of this particular job Mr. Editor, that made him feel satisfied with himself. It was the realization that he was able to use business methods in conducting his own business, of which he began to be somewhat doubtful under the pressure of Curbstone's and Carpetbagger's competition. Besides he felt that he had Prospect and Prospect's friends who may ask his advice on electrical work—well convinced that one cannot expect good dental work from a blacksmith, and that an electrical contractor has just as much right to be in business to make a profit of it as has any other professional or business man.

Yours very truly,
Mrs. I. A. M. Byer.

How Successful Contractors Handle Business

It is a fact that many wiring contractors are bewailing the hardships of their lot. They claim, generally, that their prices are cut by irresponsibles, who do the work at less than cost. Nevertheless, there are many successful men in the business. In an attempt to get at the reasons for their success, a survey has been made by the "Electrical News," and the methods used by some of the chosen ones are outlined below.

The wiring contracting business has an element of adventure in it that is undoubtedly attractive, but it is too far fetched to say that a gambling, desperate class of fellows are drawn into it for that reason, nevertheless, the vocation seems to peculiarly lend itself to business practices, that compared to ordinary mercantile transactions, are about the same as a man walking on a tight-rope compared to a man walking on the street.

Instances of this and the disasters that follow, are easy to give, in fact, the monotony of the spectacle is rendering us callous to it. Under-cutting is the word, and a few hazards that turn out badly result simply in one more quitting the field of private enterprise. This gradual elimination would not be a bad thing but that a new crop springs up, which operates on the same basis as the has-beens.

The turn-over in the electrical contracting field is enormous and the fault lies with everybody.

In the whole field, of course, there are plenty of successful house wiring contractors to be found. Their methods are varied, but the results achieved are the same—**consistency** in a sound policy is a common feature of all of them.

The "Stone" Wall Contractor

Among the successful types of wiring contractors the "stone wall" type is certainly worth of notice. This is the type of contractor who never quotes a price lower than he knows will give him a profit. He is undercut time after time, but goes steadily on his way without worrying. His jobs are well and carefully done, his costs are accurately figured and he has enough capital back of him to carry him over bad times.

One contractor of this type explained his success as due partly to the fact that he trained his men carefully and managed to keep them working steadily. It is true enough that a mechanic who is given a job for a while and then is thrown out of work when the rush is over, is not likely to have much loyalty to the concern that he so serves him. This loyalty is reflected in his work and the whole thing works around in a circle to the benefit of his employer.

It is apparent that this man who makes his mainstay the giving of good service at a fair price, is enabled to do so only by having an accurate knowledge of his costs.

The Efficiency Expert

There is another type of contractor who runs his business carefully and keeps a number of men constantly employed, though he does occasionally take bids at cost. This man works on principles of efficiency and here are a few of his practices:

(1) Will not pay high rent.

(2) Employs only first class mechanics.

(3) Pays a good deal of overhead expense from profits on sale of staple material.

If he does take a contract at a very small margin, he does so to keep his men employed. It is odd to see this man selling supplies to competitors but he does it without a qualm, figuring that the profit he makes is their contribution to his success.

The rent proposition he explains by saying that he does not need a stand in an expensive locality for his type of business. Customers do not come to him as they would to a retail merchant, in fact, he goes after them.

William Speakwell

William Speakwell does business on the glad hand, treat 'em nice, principle. He has a bunch of friends, business and otherwise, and freely admits that he gets contracts because people, including architects, are recommended to him by others. Jobs apparently come easily to this chap, but it must be remembered that it is difficult for a man to acquire such a wide circle of friends. William has apparently laid in a good foundation in days gone by and now he is cashing in on it. Of course, his work is well up to standard.

The Strategic Contractor

The strategic contractor is one who does contracting for strategic reasons only. As a matter of fact, he doesn't do any contracting at all. Long ago he became disgusted with the amount of work he had to do for very small returns, and decided to concentrate on the merchandising end of his business.

However, he had to face the fact that customers expected him to do wiring. If they came in and bought fixtures, they naturally expected him to install them. In fact, this man says that most people regard merchandising and wiring as inseparable as a chair and its legs, nevertheless, he did not like the wiring game, with its overhead and "chasing around." So he turned the matter over in his mind and finally worked out a scheme whereby, nominally he accepts any contracts that people ask him to do, but in reality turns them over to a contractor, under a working agreement, whereby the contractor does all the service work on the appliances sold by the merchandiser.

This man is not a contractor, but he is so regarded by all the people that buy electric appliances in his store, and he says the scheme works successfully.

General Schemes

There are many methods of securing non-competitive wiring business and these are usually based upon the application of merchandising methods to the sale of wiring. Education of the public is an important matter because it is generally ignorant on the subject and unable to judge as to whether a contractor's proposal for wiring is up to a proper standard of workmanship, capacity and adequacy of outlets. The same limitations apply to a large extent to architects, and builders and the only remedy is in education.

Convention of Contractors and Dealers in Toronto, November 13 and 14

The exhibit of the Diamond State Fibre Company of Canada, Ltd., this year will be at Booth 80-A, Industrial Building, Canadian National Exhibition. They will be displaying all their materials, as well as all parts they manufacture, including radio equipment.

Change Made in Name of Westinghouse Subsidary

The business of the Pittsburg High Voltage Insulator Company will be carried on in the future under the name of the Westinghouse High Voltage Insulator Company, according to announcement made by C. M. Semler, general manager. The change in name, which was made by vote of the company's stockholders does not affect the management or method of conducting the business of the company which will be carried on as it has been in the past, according to the announcement.

The Electrical Equipment of a Modern Collegiate Institute

Present-day Requirements Embrace a Variety of Uses—Lighting, Power, Signalling—Connected Load 147 Horse Power

The electrical equipment of the modern collegiate institute requires very careful selection and consideration to meet the full requirements of all the different forms of classes in this type of building. If classes are to be held at night the lighting will require special consideration in the classrooms and the laboratories. The auditorium requires to be well lighted to permit the use of the same as a community center and the general practice is to locate the auditorium in the center of the building for convenience, therefore the only means of daylight will be from the skylight in the ceiling. The power equipment, particularly for the ventilating and operation of machines for vocational training, will require to be of special design. The lighting of the class rooms should be designed to prevent any eyestrain. It should not be glaring, but should be well diffused and distributed to prevent shadows. The regulation size of classrooms should be equipped with not less than six units. The size of the unit would be determined by the mounting height, spacing and finish of the walls and ceilings. Great care should be exercised to give sufficient illumination on the blackboard in order to read the writing on the board from the last row of seats, without straining the eyes.

Large Units Required

The Hamilton Collegiate has recently been entirely rewired and relighted to conform to the very best practice of this type of building. The construction of this building was such as to require large units owing to the high ceilings and the finish being of a white pine stained and varnished. The walls are tinted a light green with blackboards on all sides of the room. The conditions did not provide good reflecting surface conditions. It was found necessary to use 6-200 watt units mounted 10 ft. from the floor and 10 ft. centers, approximately. This gave very fine lighting with no eyestrain. The four-in-one totally enclosed unit was used throughout the building, including the halls, with the exception of the cloakrooms, toilets, basement, and auditorium. The units in the "Balance" rooms were of the 100 watt size and mounted 6 ft. spacing and 9 ft. from the floor. This gave very satisfactory results for this very exacting work.

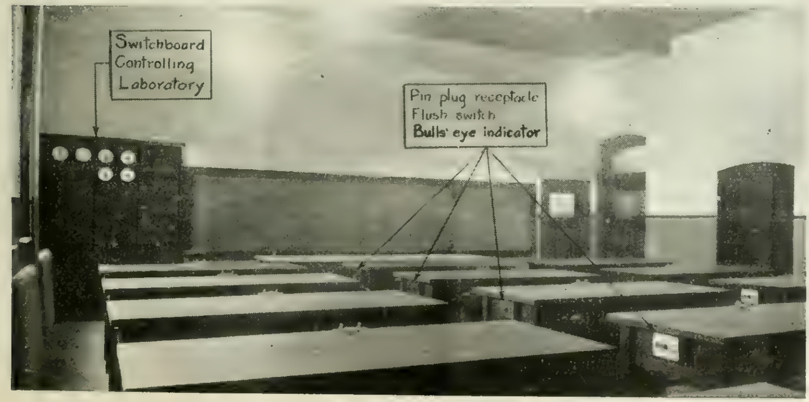
Auditorium Lighting

The auditorium lighting consisted of part direct and part indirect systems. A large skylight is located in the center of the auditorium and above this skylight were placed 500 watt reflectors mounted 3 ft. above the glass and the effect was similar to daylight and quite inconspicuous. Formerly two large chandeliers were used with 120 lamps on each fixture. These fixtures were entirely remodelled by the use of White Mazda C. tipless 50 watt lamps. The intensity was increased 50 per cent. by the use of these lamps in place of exposed lamps. The change in the appearance of this fixture by the use of these lamps was much appreciated and gave the impression of a new modern fixture. This could be done in many churches and other types of buildings to good advantage where large chandeliers are used.

The gymnasium lighting consisted of Benjamin reflectors mounted in heavy wire mesh guard on the ceiling to protect them from mechanical injury. Throughout the boiler room, manual training and fan rooms, Benjamin R.L.M. reflectors were used. The lighting in the toilets and shower rooms, consisted of vaporproof condulets mounted on the ceiling and 100 watt lamps. This unit was used to protect the lamp and socket from the moisture and vapor from the showers.

Master Control for Laboratory

The laboratory equipment for physics and chemisty is of the very best that could be obtained for this work and represents the most modern equipment installed in any building of this type to date. In the chemical laboratories every means has been provided to protect the student from the dangers of the fumes of the different chemicals used. Each student is provided with a sink of special soapstone type with hot and cold water, gas, and compressed air. The tops of the desks are special soapstone types with fume cabinets of glass. The instructor has all water, gas, compressed air and ventilation under his supervision at all times. This master control is located at the instructor's desk. The motor



Physics Laboratory of Hamilton Collegiate—Each student supplied with current from separate outlet.

to operate the ventilating fan is located with the fan on the roof. The motor is started and stopped by means of a push button and red flush bulls eye pilot lamp to indicate when the motor is operating. The Electric Controller & Mfg. Co. type Z.B. automatic starters were used for this purpose.

Separate Outlet for Each Student

The physics laboratory is provided with special electrical equipment to give students a supply of alternating or direct current from 1-250 volts according to their needs. By referring to the accompanying illustration of the senior physics laboratory the electrical outlet is shown on the side of the desk. This outlet consists of a flush type pin plug receptacle, a flush switch and an indicating flush red bulls eye lamp receptacle. Each student's outlet is controlled by a separate switch and fuse on the main switch-board to give the instructor control of each outlet so that any trouble can be traced to the student causing the same. The main switch-board to control all the physics laboratory electrical equipment is shown in the illustration. This switch-board is set flush with the blackboard, and the rear of the switch-board is protected by means of a grillwork enclosure. The direct current is obtained from two motor generator sets located in a special room in the basement. These motor-generator sets are controlled by means of Electrical Controller & Mfg. Co. automatic push botton type starters which are equipped with no-voltage and overload protection. With this equipment each student at his desk can be supplied with direct current from 1-250 volts. This is obtained by means of regulating rheostats on the switch-board. Voltmeters and ammeters of high and low scale are mounted on the board for reading the low voltage and low current. In addition to the above and by means of suitable double-throw switches each student can be supplied with alternating-current at 110 volts. A.C. voltmeters and ammeters are mounted on the switch-board for this system. Each classroom has been provided with outlets for stereopticon lanterns for lecture purposes and each one of these outlets is controlled by means of switches and fuses on the main switch-board in order to prevent any unauthorized person from tampering with the same.

Domestic Science Room—Electric Range, Hot-plates and Irons

This equipment has been designed in this manner to permit the science master to have absolute control over all electrical equipment in the laboratories. The main service equipment consists of the following:

Load Metered on Peak Basis

The service enters the building underground from the pole at the rear, 2,200 volts, 3 phase, 25 cycle. It then enters the main control room where it is protected at the entrance by means of a primary panel which consists of an automatic oil circuit breaker with overload attachment. Mounted on this panel is a polyphase integrating watthour meter and a Lincoln demand meter. The demand meter is very important on large school installations owing to the low load-factor. Before this building was rewired the total connected load was 87 h.p., after the building was rewired the connected load was increased to 147 h.p. During the month of January the peak load was 47 h.p. which was the highest peak indicated since the meter was installed. These figures show that school loads should all be metered on the peak load basis instead of the connected load. The transformers are installed in a fireproof vault. The lighting throughout the building is 3 wire, 110-220 volts, the power is 3 phase, 3 wire, 220 volts, 25 cycle.

Electric Range and Hotplates

This building has a very elaborate domestic science equipment and lunch room which includes a large electric range for the instructress and an individual electric 660 watt hotplate for each student. The full class consists of twenty-four (24) students.

The signalling equipment includes a complete telephone system and an electric clock system with a program device for announcing the different periods.

All Work Concealed Where Possible

In rewiring the building it was necessary to use rigid and flexible conduit with B.X. cable. All the work was concealed where it was convenient to do so.

Benjamin-Starrett dead front type panels were used with toggle switches throughout the building for distribution purposes.

We are indebted for the information in this article to V. K. Stalford, Consulting Engineer, Hamilton, Ont., who had charge of the design and installation work throughout.

Electric Pageing System for Hospital

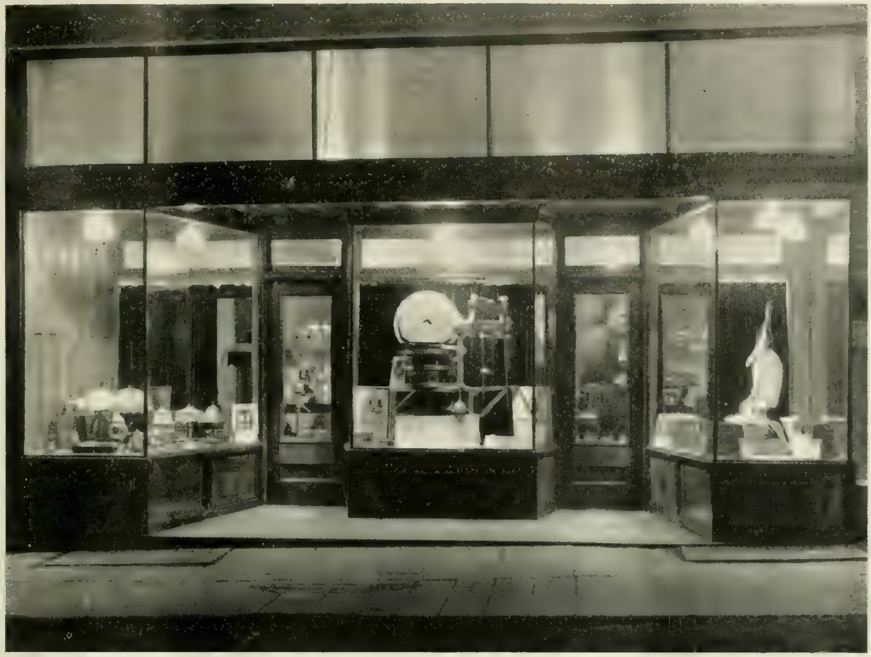
Messrs. Culley & Breay have been awarded the electrical contract for installing a doctor's pageing system throughout the General Hospital, Hamilton.

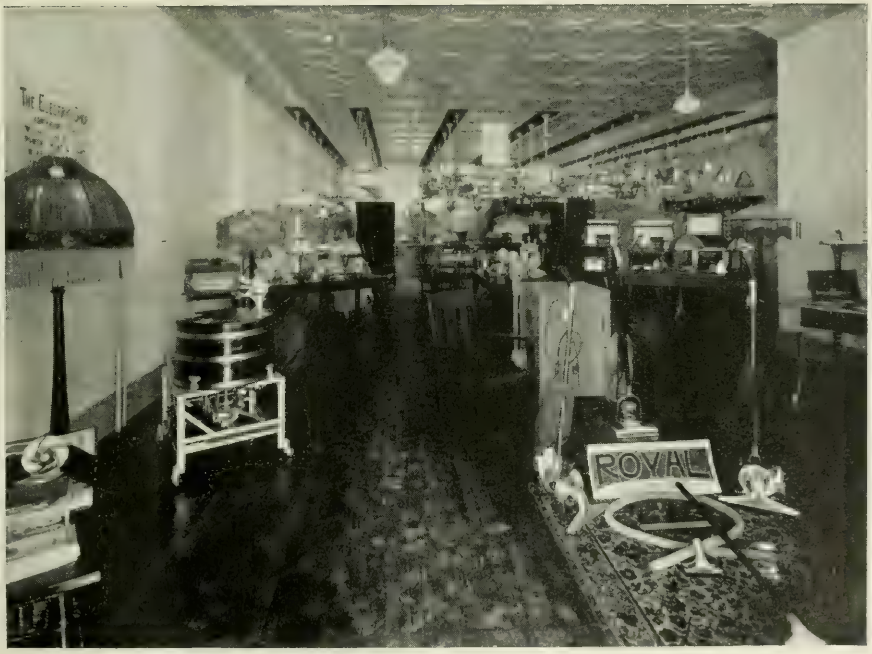
A Well Arranged Store

Mr. Charles Bowra, well known to the electrical trade, has recently opened a very fine store at 52 Simcoe St., N. Oshawa, Ont., which we illustrate elsewhere in this issue. The store, which is one of the largest in Canada being 30 ft. by 70 ft., is well stocked with a full line of electrical fixtures and appliances: also radio equipment. On the opening day tea was served; over 1,000 people passed through and made a tour of inspection. No attempt was made to sell appliances, as the large number of people made it impossible.

Secures Five Large Contracts

G. S. Whelpton, electrical contractor, Windsor, Ont., has a number of contracts at present under way, including the Ford City Separate School, Ford City Public School, Riverside Town Hall, Walkerville Baptist Church addition, and a $10,000 residence on Janette Avenue. The electrical interests in Windsor expect to be able to put an electrical home in their city in the near future.





Upper—A window display that does justice to the appliances; good lighting and plenty of space; the store front of Mr. C. Bowra, Oshawa, Ontario. Lower—Interior of the same store; each line kept separate, with the more attractive appliances toward the front of the store

It Costs More to Get New Customers Than to Keep the Old Ones*

Any contractor or dealer who will go over his books will find that there are many people who formerly patronized him who no longer are doing so. Some of these people have moved out of town. Some of them have died. There is a goodly number, however, who are still living in the community and are still in the market but are no longer counted among his customers.

There are various reasons why these customers have been lost. Some of them may not have been entirely satisfied with work that was done or an appliance that was purchased. Some of them have been attracted to other concerns. Some of them are not spending money for things electrical. They are more interested in automobiles or something else that has made a strong appeal to them.

Follow-up Necessary

In nearly all cases, however, the real reason why the customers have been lost has been due to the fact that they have not been followed up as they should. If they had been followed up in the same way that a mail order house follows up everyone who makes a purchase of even a small amount many of these customers would not have been lost. Those that are no longer greatly interested in things electrical would have continued their interest to the extent of making at least some purchases.

The easiest and cheapest way to follow up and keep in touch with customers is through the use of letters. Some of these letters may be personally written and some may be form letters. It doesn't really matter so much as long as the letters say what should be said.

Suppose a person has had a house wired, or has bought an appliance costing a fairly large sum of money. To such a person it may be well to write an individual letter. An appliance selling for less money may call for a form letter.

In either case the object of the letter is to clinch the sale. In case of the wiring job, the care with which the work has been done may be featured. Then the customer is asked if he is entirely satisfied with the work.

Asking if the work is entirely satisfactory without first pointing out the effort that has been put forth to make it satisfactory may cause the customer to look for defects. As a matter of fact such letters do sometimes bring forth complaints that are apparently made because the letter seems to present an excuse for making them.

Object of the Letter

The object of the letter is not to give such an excuse but to show the customer how much effort has been made and is being made to please him and that his business is being appreciated. This means that it must tell the customer what has been done for him.

Such a letter not only makes the customer feel better but it frequently causes him to pay his bill sooner than he otherwise would and when this is accomplished the letter has paid for itself nothing more comes of it. Showing a real interest in the customer means that he will take a greater interest in the contractor.

There are a great many people who have bought electrical appliances and have not been completely sold. That is they do not use these appliances as much as they should. They do not get the electrical habit and this hurts future sales.

Points for a Follow-up Letter

This is one reason why every appliance sold should be followed with a letter. It doesn't cost much to mail the letter and it may result in many more sales to that customer which otherwise would not be made.

Such a letter should point out the good features of the appliance. These features may all be pointed out in a booklet or circular of instructions that goes with the appliance but the letter will emphasize these points.

After these points have been taken up give a few brief directions in regard to its use, especially the different ways in which it can be used. Then touch upon its care and any service that will be rendered in relation to the appliance.

Sometimes the sale of an appliance opens the way for more wiring. When a person has purchased a vacuum cleaner, a sewing machine motor or an electric iron one or more base board outlets may be needed in order to increase the convenience of that appliance.

A letter following the sale of the appliance featuring the advantage of these additional outlets may lead to having the work done, whereas, if no letter has been written, perhaps these outlets would never be given serious consideration. If the actual cost of having the work done can be given in the letter the chances of making the sale are increased just that much.

Keeping in Touch with the Customer

The lettters that follow up the sales, however, are not so valuable from the point of view of making additional sales as they are from the point of view of keeping in closer touch with the customer. They make the customer feel that the contractor or dealer is taking a real interest in him, desires to give him thorough satisfaction and causes him to hesitate about taking his patronage elsewhere.

Holding customers is just as important as increasing their sales because it is cheaper to hold a customer than to secure a new one to take his place. In fact a customer that is held automatically means new customers for the reason that a satisfied customer will advise his friends to patronize his contractor or dealer. He will act as a salesman without pay.

On the other hand a customer lost will not send around a new customer to take his place. The chances are that he will use his influence to keep his friends from trading with that contractor or dealer.

Holding customers, therefore, means very much more than retaining the custom of present customers. It means increasing the volume of business and the number of customers at the lowest possible cost. It means more profit and it often means that better values can be given for the money spent by customers.

Customers cannot be held, however, that is the maximum number of them cannot be held by merely following each appliance or contract with a letter. It is necessary to keep in touch with them between contracts and sales.

Secure Names and Addresses

Most people who come into a store and make a purchase are willing to give their names and addresses if they are told that the firm desires to keep them informed in regard to new things and special bargains. People who have made one purchase are much easier to sell to, than those who have never made a purchase. They have already shown their confidence in the store.

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*R. [illegible] in Central Station.

A mailing list made up of people who have patronized the concern is a much more effective list than one that can be compiled in any other way. It is a very select list and more money can profitably be spent upon it than could be spent on a more general list containing many names of people to whom it would be almost impossible to sell.

Even though the initial purchase is small it will probably pay to spend a few dollars a year in following up that customer with letters. Every month, every three months, or at most every six months a letter may be mailed calling attention to appliances or service. New things may be brought to the attention of the customer, a new line of stock or anything else that can possibly be of interest.

Then again when there is an overstock of anything and it is necessary to move it, there is no need of waiting until a sale can be put on or until the stock will sell in the usual course of business in order to move it. The price on this surplus stock can be reduced and the fact brought to the attention of the customers. The customers get the bargains. Usually they appreciate this and show their loyalty to the concern by buying more and more there.

One great advantage of letters is that just the people it is desired to reach can be reached.

Surplus May Be Disposed Of

If a few more motors of certain size than it is wise to carry in stock are on hand, letters can be mailed to the people who are most likely to be interested in such motors, who can use them, and the stock be disposed of quickly and quietly.

In this way letters can be used not only to keep in close touch with the customers and to hold their trade but also to speed up the rate of turnover, because a flock of letters will dispose of any small surplus much quicker and much cheaper than it can be done in any other way. It is just a matter of writing in them exactly what you or your salesmen would say to them if they were talking to you face to face and hand only three minutes to deliver their message.

Radio Bakes Bread

Out in Muncie, Ind., recently food show experts baked a loaf of bread by radio. The actual baking was done by an electric heater, but the heat was controlled, turned off and on, by radio.

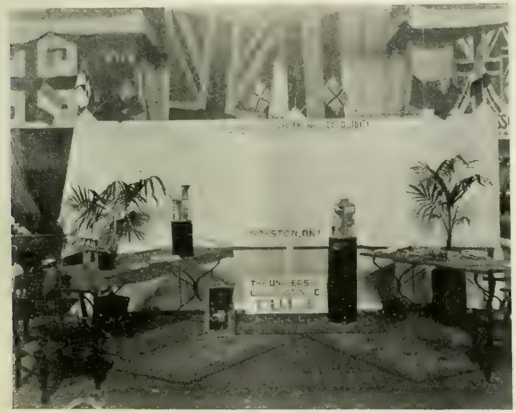


Exhibit of Canadian Cleveland Farebox Co., at C.E.R.A. Convention

Trade Publications

The A. C. Gilbert-Menzies Company, 439 King Street, W., Toronto, are distributing a new catalogue of radio apparatus. This publication is printed in two colors, and plenty of space is devoted to each article. Several types of tube and mineral sets are described, as well as accessory apparatus. The catalogue includes a letter from a Manitoba fan, describing some interesting results achieved with Gilbert radio instruments.

Mine Apparatus

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just completed the preparation of a 64 page illustrated publication on mining apparatus. In addition to line material, the publication, which is known as Catalogue 6-M, contains much information about mine safety switches, Frankel solderless connectors, tapes, babbitts, solders, micarta gears, mine locomotives and mine locomotive headlights.

New Electric Power Handbook

The Electric Power Club (Kirby Bldg., Cleveland) has issued a new addition (14th) of its handbook—covering substantially all the standardization it has effected in electric motors, motor pulleys, generators, transformers, electric tools, mining and industrial locomotives, control equipment, power switch-boards and switching equipment manufactured in this country. The handbook also contains definitions, symbols, general engineering, recommendations and other information needed by users and purchasers of electric power apparatus and control equipment. Single copies will be given without charges, to consulting engineers, architects, electric light and power companies, rated electrical contractors and educators—otherwise the charge is 50 cents per copy. At the last annual meeting of the Club the privilege of membership was extended to Canadian manufacturers.

Come to the Convention, Nov. 13 and 14.

Fergurson, Pailin Ltd., Enter Canadian Field

Another indication of the increasing interest of British firms in the Canadian field is shown by the announcement that Messrs. Ferguson, Pailin Ltd., of Manchester, England, are opening a Canadian office and warehouse. In a short time it is the company's intention to start manufacturing here and turn out entirely Canadian-made products.

Messrs. Ferguson, Pailin Ltd., manufacture switch-boards and switching equipment. This company was formed many years ago to take over the switch-board and switch gear end of the Ferranti business, and since that time have been manufacturing those lines discontinued by Ferranti.

In entering the Canadian field the British firm has entrusted its interests here to an engineer of wide experience on both continents—Mr. Herman K. Ansingh, who was formerly chief switch-board and switching equipment designs engineer of the British Westinghouse Co. and until recently has been switch-board and equipment designs engineer for the Westinghouse Electric and Manufacturing Co., at Pittsburgh. He is a member of the American Institute of Electrical Engineers and an associate of the Institution of Electrical Engineers.

Ferguson, Pailin Ltd., have just recently received an order from the Ontario Hydro-electric System for nineteen 400,000 kv.a. rupturing capacity, oil circuit breakers. Their Canadian headquarters will be at 321 King St. East, Toronto.

Montreal Contractor-Dealers Take Steps to Have Licensing Act Enforced

Last April, about the time of receipt of a charter from the Provincial Government, the electrical contractor-dealers of the Province of Quebec reorganized their association, contracting on the basis it should have been on long ago, in keeping with opportunities offered and their obligations as a part of the country's most essential industry. It would be hardly an exaggeration to say, that if just a part of the monetary expenditure, energy and serious effort spent during the past year or so by a few of the contractors of Montreal and the Co-operative Association of the Province of Quebec, to improve the electrical contractor's position and business, were applied in any other more homogeneous community, results of considerable value would have been undoubtedly achieved. As it is, one may truthfully say that certain improvement in their organization has been accomplished; that there is a considerably larger number of contractors realizing the necessity and value of a strong and influential organization, as compared with even a few months ago, and that most of them feel that they, as a branch of the industry, **"are getting there."**

And, after all, most of the existing evils, hampering the proper development of industry, depend solely on organized effort and honest, sincere co-operation.

Enforcement of Licensing Act Required

Before any real progress and actual results can be expected a few urgent matters of immediate importance must be attended to locally, some of which are not within the power of the contractors themselves to adjust, although with the help of a strong organization their accomplishment could be decidedly hastened. The most important of them is the proper enforcement of the Provincial Licensing and Inspection Act, which was procaimed about twenty-six months ago. It would perhaps be unfair to state that this Act is being put into practice with the same speed as the results are achieved in curing the deadly sick Europe through the Genoa, Hague, London, and too-numerous-to-mention other conferences, but it is nevertheless slow enough to allow the electrical contractors of the Province and especially of Montreal to garner barely 15 to 20 per cent. of the large crop of wiring contracts and numerous other incidental jobs, available through this year's very extensive building activities in the Province of Quebec. Most of the work is still done by men who are neither contractors nor electricians in the true meaning of these words.

Such condition is not only a source of business worry to the contractors but also a great handicap towards proper development of their association, which, despite all, is trying and feels that it is slowly, but surely "GETTING THERE." If action could be as easily and quickly gotten from Governments and Government officials as promises are, we ...., but why talk of the millenium for a few centuries yet?

Act Will Eliminate Undesirable Element

The proper enforcement of this act, which everybody hopes before long, is eventually bound to be attended to, will eliminate a large number of most undesirable elements posing as and encroaching on the field of the real electrical contractor.

With the disappearance of probably 60 per cent of men undertaking electrical work to-day, through the application of the Act, business failures and education of the public that their comfort, economy, protection of property and life depend on the work being done by a specialist, as far as the electrical installation is concerned, one does not need to be an optimist to visualize the improvement in the electrical contractor's business and the industry at large, but two things should be well borne in mind:—an old Japanese proverb that **patience and mulberry leaves become a silk gown,** and above all that **"things don't turn up, they must be turned up."**

To help matters along the Contractor-Dealers Association inserted in five of the Montreal dailies the following advertisement:

Electrical Contractor-Dealers Association

Province of Quebec, Incorporated

calls attention of Architects, Builders and the public at large to the meaning of the Provincial Licensing and Inspection Act, II. George V., Chapter 75.

"any electrical work at the installation of wires, conduits and apparatus for the transmission of electricity for producing heat, light or motive power in this Province can be undertaken **only by a licensed electrical contractor, employing licensed electricians."**

This Act is now in force and work undertaken by others than licensed contractors and done by non-licensed electricians is liable to be stopped by the Government Authorities. Only licensed electrical contractors are members of this Association, and are provided with proper membership cards in proof thereof.

For further information, please, apply to the Association's Headquarters, 65 McGill College Avenue, Montreal, P. Q.

From reports, this advertisement, although it appeared only once in each of the five papers spread over two days had certain effects on general building contractors and architects in ascertaining if those to whom they are giving the electrical work are licensed contractors. At least two cases are known where contracts for wiring were given shortly before the appearance of this advertisement to non-licensed men and were cancelled for fear that their work may be stopped by the Government officials and inspection certificate refused by the Underwriters, as the latter are co-operating with the Government and the Contractor-Dealers' Association in enforcing the Act.

Branch No. 2 of the Association, consisting of the English speaking contractors in Montreal, have been busy for the past few weeks on the preliminary work in connection with their fall and winter programme.

Committees Appointed

The following committees were appointed and are already at work:—

Educational: (elementary theoretical and practical course for apprentices and wiremen) Chairman, L. T. Mead, C. Langston and R. C. Barrett. This Committee is arranging with the Montreal Technical Institute for night courses for apprentices and wiremen; it is also intended to have practical demonstrations given to the wiremen by some who are known to be good mechanics, how the many details of proper wiring should be done.

Cost and Accounting: R. S. Muir, Chairman, H. Vincent, P. G. McQuaig. This Committee has as its object to arrange for meetings at which experiences of figuring overhead, cost, turnover, etc., will be discussed and compared, and probably a uniform and adequate form for calculating tenders will be adopted.

Minimum Wage: J. A. Anderson, Chairman, F. J. Parsons, L. A. Mace. The work of this Committee consists of working out and submitting scale of wage for adoption by all the members of the Association both for the journeymen and the apprentices and helpers. It is hoped by this means to stabilize the great variation in the existing scale of wages and to attract a proper type of men into the electrical work, of whom great lack is felt just now.

Complaints: E. J. Gunn, Chairman, A. Bell, M. R. Henry. Complaints of breach of code of business ethics, unfair competition on the part of members, and others in the industry who are not supposed to encroach on the field of the contractor's merchandising activities, will be investigated by that Committee before being submitted to the Association for action.

Membership: D. C. Smith, Chairman, C. Booth.

Electrical Homes: R. C. Barrett, Chairman, M. R. Henry, E. C. Gregory. The duty of this Committee is to and have been gradually heading towards putting electrical enlist assistance of as many contractor-dealers members of the Association and their staff to act as attendants at the Electrical Homes Exhibits as possible, and to see to it that those who promise to act are assigned the proper duties and days.

It is strongly felt by the contractors who, during the past winter, served as attendants at the Electrical Home, that no better practical school of salesmanship could be thought out than the direct contact with the visitors in a home.

It is expected during the coming winter to have also organized appliance and fixtures dealers sections, of which there is a great need and a large scope for organized efforts.

Third Electrical Home for Montreal

The city of Montreal will open to the public on September 16th another "Modern Electrical Home", which will close on October 7th. This is the third educational exhibit arranged by the Electrical Co-operative Association, Province of Quebec, and the second during the present year.

Montreal continues to carry on the Electrical Home Campaign not because it is a seasonal fad, but because all the branches of the industry earnestly believe and have satisfied themselves that it is a most efficient and economical means of educating the public to the wider use of electricity. Besides, it actually demonstrates advantages derived from proper and adequate wiring of houses, has considerable and beneficial influence over the homeseekers and builders, at the same time giving an opportunity to the contractor-dealers and their staffs to come in contact with many prospective clients and to educate themselves in indirect salesmanship.

Opening of Home

The Home to be opened on September 16th. is located at 323 Wilson Ave., just above Cote St. Antoine Road, a little over a block from a street railway stop.

Notre Dame de Grace district, where the home is located, is essentially a residential part of the city, consisting of medium sized and priced houses, the bulk of which are owned by the occupants. The building programme of that district this year and for the next two or three years, is probably the most extensive of any part of the city, which in itself is an advantage. The house used for the Electrical Home is one of some twenty built this year by the Lancashire Land Construction Company, which has wired a number of the houses according to the plans prepared by the Wiring Committee of the Co-operative Association, and which appeared in the Electrical News of August 15th.

The present home has the advantages of location and season over the previous one and a considerably larger attendance is expected.

Features of House

The lay out of the house itself lends better to such a purpose; besides, the illumination both interior and exterior, the furnishings and equipment will be more carefully attended to. Several new features not available for the previous Home will be included in this one, which will add to the attraction. Among them are electrical dining and bed room sets, the first ones of the kind manufactured in Canada; the Gibbard Furniture Company of Napanee, Ont., on representations made to them by the Co-operative Association, have decided to make up the first electrical set of furniture, which will forcibly impress upon the visitors the advantage of a sufficient number of convenience outlets properly placed in the rooms not only to derive comfort but also to enable the rearrangement of furniture in the rooms to suit the fancies of the ladies.

Another improvement will be the placing of a radio receiving set in the adjoining house, the idea being not to interrupt the traffic in the Electrical Home itself and not to distract the attention of the visitors—where both concerts and full explanations of the working of this latest invention will be afforded to the public.

The Committee which has the electrical Home in hand is as follows:

Financial: C. F. Medbury, Can. Westinghouse; W. O'-Brien, Montreal Light, Heat & Power; M. K. Pike, Northern Electric Co; J. W. Pilcher, Can Gen. Electric; N. Simoneau, President. Electr. Contractor-Dealers Assn.

Illumination: G. E. Jacquet, Mitchell-Holland; L. A. Kenyon, Montreal Light, Heat & Power; L. H. Marrotte, Public Service Corporation; Geo. McDougall, McDougall, Pease & Friedman, Cons. Engineers; Fred Parsons, MacDonald & Willson; J. Rosenthal, Can. Electrical Supply; L. V. Weber, Jefferson Glass.

Appliances: C. D. Slimpin, Montreal Light, Heat & Power; Geo. L. Atchison, Southern Canada Power Comp.

Advertising and Publicity: C. E. Fortier, Bell Telephone Comp.; N. L. Engell, Public Service Corporation; G. R. Allerton, Northern Electric; C. D. Slimpin, Montreal Light, Heat & Power.

House Committee: C. D. Slimpin,Montreal Light, Heat & Power, Chrmn.; G. Atchison, Southrn. Can. Power, Vice-chrmn.;N. W. Fairlie. Monarch Elec. Comp.; H. Lee Jones, Can. Gen. Electric; J. A. Anderson, contractor-dealer; C. Barrett, contractor-dealer; E. A. Gregory, contractor-dealer; M. L. Henry, contractor-dealer; J. A. St. Amour, contractor-dealer; J. N. Tremblay, contractor-dealer; E. C. McGovern, Northern Electric; W. Parke, Renfrew Electric; N. Clarke, National Heating Appliance; H. Vincent, Electrical Contractor; M. W. Farthing, Bell Telephone.

The Co-operative Association has also under consideration a plan to open to the public during the coming winter and early spring an electrically equipped home where, twice a week, actual demonstration of the various appliances would be given by experts. There is no doubt that once the women became educated to appreciate the value of the many electrical appliances, and the electrical contractor-dealers learn to be better salesmen than they are just yet, the business from the merchandising point of view as well from the point of augmented power sales will be marked. In the meantime, however, this campaign remains purely educational and everybody is expected to take as broad a view of his part in it as the original idea of the "Electrical Home" Campaign was from the outset.

A Permanent Exhibit

In the office of the Co-operative Association at 65 McGill College Ave., there will be installed a compact and complete exhibit of electrical supplies, which will be accessible to the architects at all times.

With the considerably increasing building activities such an arrangement should prove to be of benefit to both parties and to the public at large.

Copies of the suggestion for properly wired houses are also sent to all persons taking out building permits and are distributed among the builders.

The number of inquiries and requests for the plan by persons interested from a practical point of view which are received personally and by mail in the office of the Association, despite a very scant publicity as yet, are the best proof that people are ready to be educated as to what is required in the matter of electrical installation to make their houses fully modern.

Other speculative builders gradually will have to follow for purely competitive reasons; besides, prospective buyers of houses and tenants will demand better wired dwellings.

The greatest difficulty, however, is being experienced in having the electrical contractor-dealer become, if not a real, then at least a half salesman—to be something more than a mere wireman satisfied with accepting a contract for putitng in electrical installation according to suggestions or orders of an owner who is ignorant or ill-informed as to how the house should be wired; in making him use business arguments and business language in selling his knowledge and his skill in what is right and what is wrong, what is obsolete and what is modern, in an electrical installation of a modern house.

The Electrical Contractor-Dealers' Association, Province of Quebec, Inc., is already getting ready an educational plan for their members during the next fall and winter which eventually is bound to accomplish its aims.

Canadians Qualified for Hoover Convention

At the beginning of the present year the Hoover Suction Sweeper Co., of Canada Ltd., allotted to each Canadian district manager a fixed number of machines on condition that if he sold them within a certain specified time he would get free passage to the Hoover "Go-Getter" convention, which was held at Hoover camp, North Canton, Ohio, commencing August 2nd., 1922. We are advised that six Canadian district managers have qualified as follows: J. B. Fleming, district manager for the Maritime provinces, located at Halifax, N. S.; J. F. Paxton, district manager for York County, located at Toronto, Ont.; W. D. Booker, district manager for South Eastern Ontario. located at Hamilton, Ont.; G. T. White district manager for South Western Ontario; Wm. Crawford, district manager for the province of Manitoba, located at Winnipeg, Man.; P. T. Brinsmead, district manager for the province of Saskatchewan, located at Regina, Sask.

Personal

Messrs. E. Thinel and W. A. Dagenais, both energetic, experienced electricians, have opened up business at 402 Wellington Street, Ottawa. Under the name Electric Heating and Contracting Co., they will manufacture the Capital unbreakable hot plate; also make installations and repair all kinds of electrical equipment,

"Never lost a customer in ten years" is claimed by Stewart & Morkin, electric motor experts, London, Ont. This business, that has been in existence more than ten years, has been built up on the policy of efficiency and service. A fully-equipped workshop on Fullarton street, with a large staff of experts, enables this firm to do any kind of work on electric motors, besides handling the Bosch magneto service for the city.

Messrs. L. Price and J. Hawke, proprietors of the Auto Electric Service, London, Ont., have recently taken over the Western Ontario agency for the Auto Lite, Delco, Remy and Connecticut electrical appliances and conduct the official service station in London for the firms manufacturing these units. This firm find their larger quarters at 38 King Street are a great help in handling their increased business.

Retailer-Jobber Relations

"The great need of the Electrical Industry today is the development and maintenance of dealer prosperity. This cannot be done on low prices and narrow margins. We are telling our dealers that their most important duty is to give service—real service that will sell goods. If they are going to do this, they must have a gross profit large enough to pay the cost. In other words, it costs money to sell goods, and this means a sufficient profit must be made."

"The sizing-up process carried through by the jobber's salesmen goes much farther than the retailer's credit standing. The latter himself must be analyzed. How is he regarded by the community at large? Is he popular personally? Does he make himself felt in local civic and commercial enterprises having as their object the good of the community as a whole? Is the atmosphere of his store friendly and pleasing? Does the way he advertises seem to indicate that he understands advertising as a business-building force?"

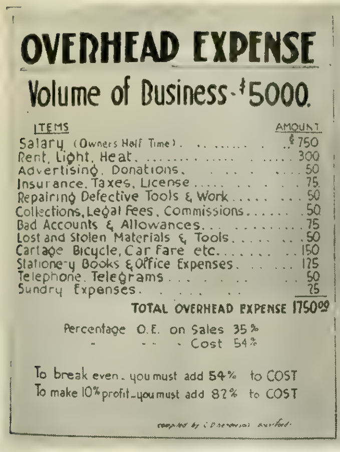
"Is the retailer of a type that will "grow" with the company? His size at the time does not count. He may be the town's largest dealer in his line or the smallest. But is he willing to be taught and helped? Is he capable of future development along the generous lines contemplated by the jobber's plan? In short, will he work with the jobber and permit the jobber to work with him to the end that a business profitable to both, shall be built up."

Home Building and Appliance Sales go Hand in Hand

Building activity and possibilities for appliance sales go hand in hand. Right at the present time there is more home building in progress than there has been for a long time past. It is easy to put two and two together.

Building expositions, own-your-home shows, better-home exhibits are being held in many cities. These shows are nothing more or less than advertisements or, if you please, suggestions to people to build. And the point is that people are building.

If a building show is a good advertisement for individuals and companies that are interested in furnishing material for new homes, it is certainly a good place to advertise the electrical appliances that do so much to make the home comfortable.



OVERHEAD EXPENSE

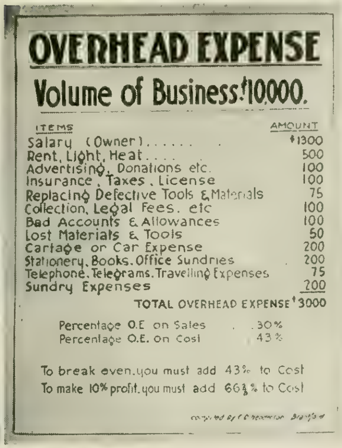
Volume of Business-$5000.

ITEMS	AMOUNT
Salary (Owners Half Time)	$750
Rent, Light, Heat	300
Advertising, Donations	50
Insurance, Taxes, License	75
Repairing Defective Tools & Work	50
Collections, Legal Fees, Commissions	50
Bad Accounts & Allowances	75
Lost and Stolen Materials & Tools	50
Cartage Bicycle, Car Fare etc.	150
Stationery Books & Office Expenses	175
Telephone, Telegrams	50
Sundry Expenses	75
TOTAL OVERHEAD EXPENSE	1750.00

Percentage O.E. on Sales 35%
" " " Cost 54%

To break even, you must add 54% to COST
To make 10% profit, you must add 82% to COST

compiled by C D Henderson Brantford



OVERHEAD EXPENSE

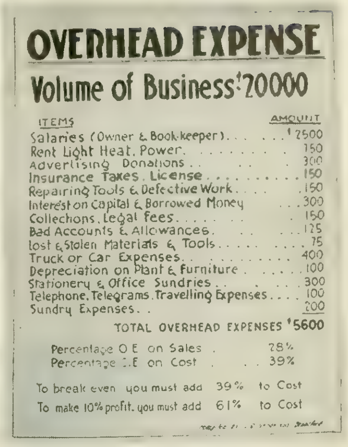
Volume of Business $10,000.

ITEMS	AMOUNT
Salary (Owner)	$1300
Rent, Light, Heat	500
Advertising, Donations etc.	100
Insurance, Taxes, License	100
Replacing Defective Tools & Materials	75
Collection, Legal Fees, etc	100
Bad Accounts & Allowances	100
Lost Materials & Tools	50
Cartage or Car Expense	200
Stationery, Books, Office Sundries	200
Telephone, Telegrams, Travelling Expenses	75
Sundry Expenses	200
TOTAL OVERHEAD EXPENSE	$3000

Percentage O.E. on Sales 30%
Percentage O.E. on Cost 43%

To break even, you must add 43% to Cost
To make 10% profit, you must add 66⅔% to Cost

compiled by C D Henderson Brantford



OVERHEAD EXPENSE

Volume of Business $20000

ITEMS	AMOUNT
Salaries (Owner & Book-keeper)	$2500
Rent Light Heat, Power	750
Advertising Donations	300
Insurance Taxes, License	150
Repairing Tools & Defective Work	150
Interest on Capital & Borrowed Money	300
Collections, Legal Fees	150
Bad Accounts & Allowances	125
Lost & Stolen Materials & Tools	75
Truck or Car Expenses	400
Depreciation on Plant & Furniture	100
Stationery & Office Sundries	300
Telephone, Telegrams, Travelling Expenses	100
Sundry Expenses	200
TOTAL OVERHEAD EXPENSES	$5600

Percentage O.E. on Sales 28%
Percentage O.E. on Cost 39%

To break even you must add 39% to Cost
To make 10% profit, you must add 61% to Cost

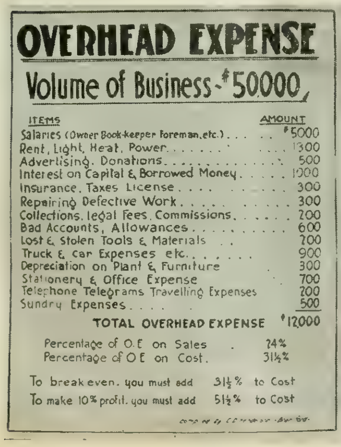
compiled by C D Henderson Brantford

O-V-E-R-H-E-A-D!

A few weeks ago C. D. Henderson of Brantford gave the electrical contractors down in the Niagara district a talk on "Overhead." This is something Mr. Henderson has made a close study of, and the charts he has worked out, some of which are reproduced on this page, were at the same time an education and an inspiration to the electrical fellows down in the fruit district. J. H. Sandham, who handles a camera almost as well as he does a wiring job, sent the Editor these pictures of Mr. Henderson's cards. It was very thoughtful of him and we all appreciate it.

Note that the figures have been worked out for four different turnovers viz; $5,000, $10,000, $20,000 and $50,000. Study very carefully that long list of expenses:—every one of them is a fact. To make a 10 per cent. profit you have to add 82 per cent. on cost, on a $5,000. turnover. If you only add 54 per cent. you make no profit. If you add less than 54 per cent. **you are losing money.**

An interesting point, which is prominently brought out by the charts, is the fact that overhead goes down with the volume of business. The smaller business has not as many items as the larger ones but has a greater total in regard to the volume. This fact is known beyond question, but it is still possible, to run across a man in a small way of business who makes no calculation of overhead expense. It seems a silly question to ask any business man if he is sure he is making a profit. We all know of a number of instances, however, where dealers appeared to be prosperous—looked prosperous, acted prosperous, thought they **were** prosperous and yet, in the course of a few years, went to the wall. The "business mortality" rate is high and the reason is mainly that expenses and profits are figured incorrectly. Don't do business at a loss. There is no pleasure in it and **nobody thanks you.**



OVERHEAD EXPENSE

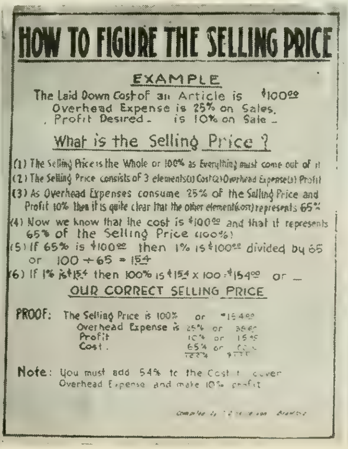
Volume of Business-$50000,

ITEMS	AMOUNT
Salaries (Owner Book-keeper Foreman, etc.)	$5000
Rent, Light, Heat, Power	1300
Advertising, Donations	500
Interest on Capital & Borrowed Money	1000
Insurance, Taxes License	300
Repairing Defective Work	300
Collections, legal Fees, Commissions	200
Bad Accounts, Allowances	600
Lost & Stolen Tools & Materials	200
Truck & car Expenses etc.	900
Depreciation on Plant & Furniture	300
Stationery & Office Expense	700
Telephone Telegrams Travelling Expenses	200
Sundry Expenses	500
TOTAL OVERHEAD EXPENSE	$12,000

Percentage of O.E. on Sales 24%
Percentage of O.E. on Cost. 31½%

To break even, you must add 31½% to Cost
To make 10% profit, you must add 51½% to Cost

compiled by C D Henderson Brantford



HOW TO FIGURE THE SELLING PRICE

EXAMPLE

The Laid Down Cost of an Article is $100.00
Overhead Expense is 25% on Sales.
Profit Desired - is 10% on Sale -

What is the Selling Price?

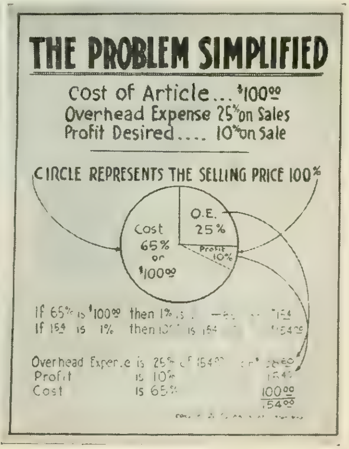
(1) The Selling Price is the Whole or 100% as Everything must come out of it
(2) The Selling Price consists of 3 elements (1) Cost (2) Overhead Expense (3) Profit
(3) As Overhead Expenses consume 25% of the Selling Price and Profit 10% then it is quite clear that the other element (cost) represents 65%
(4) Now we know that the cost is $100.00 and that it represents 65% of the Selling Price (100%)
(5) If 65% is $100.00 then 1% is $100.00 divided by 65 or 100 ÷ 65 = 1.54
(6) If 1% is $1.54 then 100% is $1.54 x 100 = $154.00 or -

OUR CORRECT SELLING PRICE

PROOF:			
The Selling Price is	100%	or	$154.00
Overhead Expense is	25%	or	38.50
Profit	10%	or	15.40
Cost.	65%	or	100.00
	[illegible]		[illegible]

Note: You must add 54% to the Cost to cover Overhead Expense and make 10% profit

compiled by C D Henderson Brantford



THE PROBLEM SIMPLIFIED

Cost of Article... $100.00
Overhead Expense 25% on Sales
Profit Desired.... 10% on Sale

CIRCLE REPRESENTS THE SELLING PRICE 100%

If 65% is $100.00 then 1% is [illegible] 1.54
If 1.54 is 1% then 100% is 1.54 [illegible] $154.00

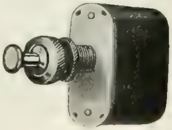
Overhead Expense is 25% of 154.00 or $38.50
Profit is 10% 15.40
Cost is 65% 100.00
154.00

compiled by C D Henderson Brantford

The Latest Developments in Electrical Equipment

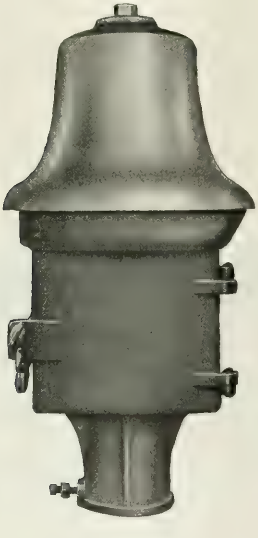
Utility Automobile Switch

The Benjamin Electric Manufacturing Co., 11-17 Charlotte Street, Toronto, Canada, are handling the sale and manufacture of a new switch, designed for the dash control of automobile lights, particularly additional lights such as "courtesy" and double lamps. The product is known as the "C-H utility Automobile Switch" and was originated by the Cutler-Hammer Manufacturing Co.; it is provided with a quick make-and-break mechanism which it is claimed is not affected by the vibration of the car. The switch is operated by means of a nickel-plated push-and-pull button. When installing, it is necessary to drill only one hole in the dash, insert the switch stem and tighten a lock nut. Lock washers are provided for both sides of the surface on which the switch is installed, thus permitting the securing of the switch to different thickness of metal or wood.



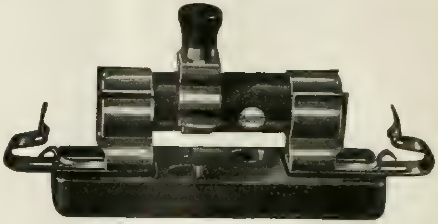
Locomotive and Crossing Bells

A line of locomotive and crossing bells has been placed on the market by the Thomas Smith Company, Canton, Ohio. The type illustrated can be supplied for voltages from 6 to 650, either a.c. or d.c. Current-carrying parts are insulated from the casing by a slate base and porcelain bushings. The bell itself is made of cast steel or bell metal and has a coppered finish. It is claimed that the bell fastening is theft-proof, and permits inspection while in operation. The mechanism is motor-driven, and it is said that all the wearing parts are hardened and ground.



Lightning Protector and Pull Switch

A lightning protector offered by the Fernando C. Mesa Company, Irvington, N. J., meets those requirements for radio apparatus which specify that aerials be grounded at all times when radio apparatus is not in use, except in sets used for receiving only, when the ground switch may be replaced by an approved type of lightning arrester. It is claimed that the protector can be left permanently connected in the circuit without detracting from the signals received.

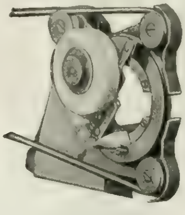


Combination Waffle and Pancake Iron

The Majestic Electric Development Company, San Francisco, Calif.,have recently placed on the market a combined waffle and pancake iron, which is electrically heated. It is claimed that no grease is required and hence no smoke or odor is created. The device consumes 660 watts and is furnished with Marsh Patent Licensed wire. Attachments include a plate warmer top, special folding handle, and aluminum double duty plate. It is sold complete with heater cord, on-and-off switch and separable plug.

Armature Coil Taping Machine

A self-feed armature coil taping machine has been brought out by the P. E. Chapman Electrical Works, St. Louis, Mo. It is furnished singly or with motor drive as desired. The manufacturers claim that the self-feed is a simple device with no gears, cams or belts, and requires no "setting up" for a job. The operation of the machine is about the



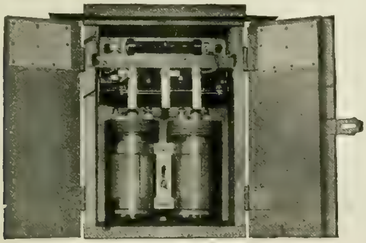
same as that of a plain taping machine, but is said to be easier. The feed can be varied to obtain a variety of laps and the pull of the tape is taken off the operator to such an extent, it is claimed,—that the coil can almost be allowed to lie in the operator's hands while taping

Vertical Wire Clamp

The problem of attaching a vertical wire to a common line insulator and keeping the latter in correct position, is claimed by the States Company, 19 New Park Ave., Hartford, Conn., to have been solved with their "Thesco" clamp. This device fits standard insulators and it is claimed to cut the energy losses of distribution by keeping down a leakage from the conductor to the insulator pin. The clamps are made of malleable iron, galvanized by the hot dipping process. Both halves are alike and interchangeable. The manufacturers claim that these clamps will not break the glass, as there is but one bolt and the covering of the conductor receives the pressure that may result from unequal expansion.

Direct-Current Lightning Arrester

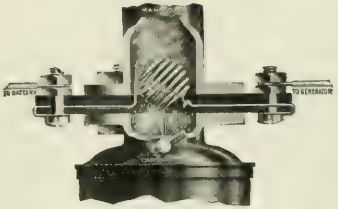
A direct current electrolytic lightning arrester, for voltage applications up to 3,800 volts has been recently developed by the Westinghouse Electric & Manufacturing Company. The device contains one to twelve cells and is designed for car or station use on railway, power and lighting circuits. The construction embodies two aluminum plates immersed in a suitable inorganic electrolyte and supported from a porcelain cover clamped by a zinc ring to a glass jar with a gasket placed between the porcelain cover and the glass jar.



Hollow concentric cylinders made from sheet aluminum form the plates, the outer cylinder or plate being punched and upset at frequent intervals in order to allow free circulation of the electrolyte within the cell. Balancing resistors are used with arresters of more than one cell. The arresters are "floated" between the line and ground, so that a leakage current of only a few milliamperes passes continually. This leakage current serves to keep the film upon the aluminum plate or plates in proper order. The device is capable of passing a surge current of approximately 1000 amp. at double normal voltage when the arrester is functioning and one arrester should be used for each 500 kw. of feeder bus, rotary converter or motor-generator capacity to which the arrester is connected. Any voltage in excess of normal line voltage is discharged promptly through the arrester. The arresters are mounted and securely held in asbestos board and wool-fibre-lined cypress boxes.

Fuel Electrofier

The Bukolt Manufacturing Company have recently placed on the market a device for heating and vaporizing gasoline fuel by means of electric heat before it reaches the cylinder. It is claimed that this is accomplished by means of a heat coil of special material which produces heat at the least resistance. The cut depicts the arrangement of the apparatus which includes a wire ball forming a screen through which the fuel must pass. This ball is heated red-hot and transforms the liquid into gas ready for explosion under cylinder pressure. The heat coil is placed and connected in between the carburetor and manifold on the charging line between the generator and battery.



Favor 12 Gallon Tank as Standard

The idea of standardizing on a 12 gallon tank for electric homes, suggested in a recent issue by Mr. S. H. Excell of Vernon, B. C., has met with considerable favor. Here are a couple of letters from electric merchants:

Ottawa, Aug. 11.

Editor Electrical News,

Regarding H. S. Excell's suggestion for 12 gallon water tank for household use. We are of the opinion that the 12 gallon tank would be more advantageous from an economical point of view, and would give enough hot water for ordinary every day use. It would also lower the cost of installation. Standardizing on the 12 gallon electrically heated water tank would be a step in the right direction.

Yours truly,
P. E. Marchand

Toronto, Aug. 3.

Editor Electrical News:—

We are quite in accord with Mr. Excell's suggestion that a 12 gallon water tank is ample for the average medium household and we would like to see the trade standardize on a smaller tank.

Yours very truly
Taylor Bros.

Current News and Notes

Bright, Ont.

Hydro power was turned on here for the first time recently. The streets are not lighted yet but it is expected that this addition will soon be made and the town live up to its name, literally.

Cap de La Madeleine, Que.

The city of Cap de La Madeleine was recently without telephonic communication, a fire which destroyed the Union Hotel having buried the telephone cables nearby.

Galt, Ont.

The general charge in Hydro rates contains increases in the power and street lighting charges for this community. Manager W. H. Fairchild explained that the new rates provide for an increase of 15 to 20% in the street lighting charges and that the principal change was in the power charges, which amounted to practically an increase of 25% in the service charge. Previously the charge was $1 per h.p. with discounts of 25 and 10 per cent. Under the new rates the 25% discount is removed. The former charge amounted to 67½ cents a month per h.p. net, while under the new schedule of rates it will be 90 cents a month.

Guelph, Ont.

When the upper part of a telephone pole on which he was working broke off and fell to the ground, near Palmerston, Mr. Scott Cowan, was instantly killed. The pole on which he was working at the time of the accident was 40 feet in length, and when a piece broke off it near the top he fell with it.

Hamilton, Ont.

Adrian Rosseau, Vaudreuil, Que., was electrocuted recently while stringing wires for the Canadian National Telegraphs here. A charge of 2,200 volts passed through him, killing him almost instantly.

T. J. Stewart, M.P., for West Hamilton, recently stated that when the Grand Trunk railway is taken over by the Government portions of the lines will be electrified, including sections surrounding Hamilton. Although the main lines would not be electrified, the shorter runs were sure to be, Mr. Stewart stated. It was very likely that an electric service would be established between Hamilton and Toronto to relieve the passenger congestion upon the regular steam trains.

Hamill's Point, Ont.

At the summer home of J. R. C. Hodgson, Hamill's Point, Muskoka Lakes, radio programs are received with such volume that they are heard all over a room 40 feet long. The distance from the nearest broadcasting station is approximately 150 miles.

Ingersoll, Ont.

Public announcement was made recently that the business of the Hydro Department of the Utilities Commission had been placed on a strictly cash basis. Those who fall in arrears will have their service discontinued. It is understood that there are a number of fairly large accounts that have long been outstanding.

Kitchener, Ont.

A petition for ornamental lighting on Frederick Street has been sufficiently signed and certified. It was thought for a time that difficulty would be experienced in obtaining consent from the C. P. R. Telegraph company for the placing of the wires underground. The company has a franchise on the street and the city could not oblige the company to remove its wires from the poles.

The consent of the company to place the wires underground has been obtained with the understanding that the city pays for and supplies a duct to carry the cables of the telegraph company . The expense entailed in providing this concrete duct is cared for in the $26,000 estimate and is also noted on the petition which has been certified by the clerk. A trench will be excavated and concrete ducts constructed to carry the light and domestic service wiring on one side and the telegraph wiring on the other side.

Lobo Township, Ont.

Lobo Township will have the opportunity of deciding by vote whether hydro-electric power will be brought into the township or not according to a unanimous vote of the township council.

London, Ont.

One-man safety cars will be seen on London streets in the near future, following the action of the city council, which has granted the London Street Railway Company permission to operate five new cars of this type. If they prove a success, the company will be permitted to purchase more of these cars.

Listowel, Ont.

The Ideal Mfg. Co., are installing complete equipment for manufacturing a patent bread moulder. They are asking for prices on small electric motors in quantity.

Montreal, Que.

Approval has been given by the city council to the proposal to award to the firm of G. M. Gest, Limited, the contract for the construction of underground conduits in District No. 6 and District No. 9. The former is a large area extending from St. Lawrence boulevard from Craig to the river front and bounded on the east by Berri street. The older district is west of Bleury from Craig to St. Catherine, including Beaver Hall Hill, Dorchester and University Streets. This work will be undertaken immediately, and will be completed before the snow falls.

Oakville, Ont.

Oakville is the first of the municipalities along the proposed route of the Toronto-to-Niagara radial to which Chief Engineer F. A. Gaby of the Provincial Hydro Commission has submitted the draft resolution, which, according to the 1922 legislation, all municipal Councils must carry before the project receives Government sanction. Mr. Gaby found the Oakville representatives more convinced than ever as to the feasibility and desirability of modern rapid transit service from the border to Toronto, and the resolution was carried without a single adverse comment or an expression of doubt as to its ultimate success. Mr Gaby spoke optimistically of the situation and reiterated his declaration that the proposed radial line was to be of best modern construction, double-tracked in its early stages at least to Long Branch, with cars attaining a maximum speed of from 60 to 70 miles an hour into Toronto. "Conditions have changed since 1920," he said. "Prices have dropped from 25 to 50 per cent. We have prepared recently estimates, and can assure you that this railway between Port Credit and St. Catharines can be constructed considerably below the estimate that was submitted to the electors in January, 1917, and that, in view of conditions today, greater population throughout the district to be served, and the greater necessity for rapid transit, the revenue would be very much higher." Asked later what he estimated to be the reduction in cost on the line, Mr. Gaby said: "Anywhere from $750,000 to $2,000,000 less than the amount stated in your by-laws, depending on what it costs us for right of way. And even that includes considerable more double-track and more equipment than the estimate of the fall of 1916. Your district has grown, and requires more equipment.

Ottawa, Ont.

The dispute between the C.P.R. and its telegraphers has been settled it was stated at the Department of Labor recently. The dispute concerned a revision of the rules under which the telegraphers work. A board was appointed to deal with the dispute, D'Arcy Scott, of Ottawa, being chairman; U. E. Gillen, of Toronto, representing the company, and David Campbell, of Winnipeg, the men. After some progress had been made with proceedings before the board, negotiations were resumed directly between the company and the men and these negotiations have now resulted in a settlement.

Perth, Ont.

Mr. W. H. Collings, Perth, Ont., well known to the electrical trade, has recently opened a new store in that town, handling a full line of electrical fixtures.

Port Arthur, Ont.

One-man street car service on the Port Arthur civic railway has been initiated. In a bulletin issued by M. M. Inglis, Manager of Public Utilities, the co-operation of employees of the railway is asked for to make the service a success. The Public Utilities Commission will employ the necessary men to man the crossings where the street car tracks cross steam rails. It is hoped that in the near future the Utilities Commission will have a ruling from the Railroad Board regarding as to who shall be responsible for the maintenance of crossing watchmen. A thirteen-minute service will be given. Fort William is also ready to put one-man cars on the road and Port Arthur's intention is being communicated to the Fort William Utilities Committee, so that a uniform service can be given. When the schedule is in complete operation, eight cars will be on the main line run.

Quebec, Que.

The first intimation of the actual plans for the expansion of its street railway system by the Quebec Railway, Light, Heat and Power Company, has been given in the form of an interview with Mayor Samson. According to the report, work is already under way and is being rapidly pushed forward with a view to linking up the parishes of St. Sacrament and St. Malo, and it is estimated that the work will be completed in a few weeks. The new line will extend from the present terminus on St. Valier street to the famous "Bell Slope," and thence to St. Malo. It is understood that ten double truck cars have been secured by the company and that these will be in commission by the 1st of September. This addition to the rolling stock will eliminate the congestion which has prevailed in Quebec during the exhibition.

Stave Falls, B. C.

The Western Power Company of Canada, at Stave Falls, are contemplating extensive improvements. They are advertising in the Fraser Valley Record their application for a license to take and use 6,300 c.f.s. out of the Stave river, and also to store 220,000-acre feet, and to flood 15,000 acres of land.

Toronto, Ont.

The first automatic telephone switchboard to be known as the Grover Exchange is to be installed by the Bell Company in the east end, and by 1924 a second, the Elgin Exchange, will be installed down town in the new addition to be built at Temperance and Sheppard streets. Expenditures are also to be made in extensions to Parkdale, Main, Gerrard, Beach and in upper Dufferin street and Birchcliffe sections. In Toronto there are 110,000 subscribers and nearly 10,000 awaiting connections. Toronto's total number of subscribers is about 30 per cent. of the company's list.

Important Transformer Order

The Ferranti Meter and Transformer Manufacturing Company has recently received an order from the Hydro-electric Power Commission of Ontario for 179 transformers for the Commission's rural distribution systems. The transformers ordered are for 25 cycle service in sizes 5, 7½ and 10 kv.a. The Commission also placed with the same company an order for approximately twelve hundred three wire watthour meters.

Nova Scotia T. & P. Statement

Nova Scotia Tramways and Power Company for the six months ended June 30th, 1922 shows a change in its earnings position as compared with the first half of 1921. While there is no material difference in gross earnings, operating expenses have been reduced by over $100,000, making the ratio of operating to gross only 69.91 per cent., as compared with 81.37 per cent. last year. After allowance for taxes and interest and sinking fund requirements, there remains a surplus in excess of $59,000, compared with a deficit of over $22,000 for the corresponding period of 1921.

Wiring Contracts Awarded

Barrie, Ont.

Kilgone & Lambert, $3,500 res., Florence St.

F. Carpenter, $4,500 res., 20 Toronto St., E.

Belleville, Ont.

Moss & Stocks Elec. Co., 1145 Yonge St., Toronto, schoo.l

Cochrane, Ont.

H. W. Bishop, $4,200 res., 4th Ave.

Edmonton, Alta.

Hillas Elec. Co., library.

Fredericton, N. B.

Allan Staples, Queen St., $6,000 res., Landsdown St.

Wm. Boone, North Devon St., York Co. $5,000 res., Aberdeen & Northumberland Sts.

Hamilton, Ont.

John Fish & Percy Brown, $100,000 school, Wellington St., Wentworth St. & Brantdale Ave.

Kitchener, Ont.

Otto Reiber, Waterloo, $4,500 res.

Harris & Marson, 819 Parkway Ave., $375,000 technical school, King St. W.

Star Electric Co., King St., W. $4,500 res., Fairview Ave.; $4,500 each 2 res., Krug St.

London, Ont.

Arthur C. Bryce, 393 Grey St., 2 $8,200 res., Wortley Rd.; $6,500 res., Ridout St., S.

Moncton, N. B.

J. W. McCartney, St. George St., $5,500 res., Botsford St.

Wm. G. Crowley, St. George St., $15,000 3 flats, West St.; $5,000 res., Portledge Ave.

Edgar LeBlanc, Church St., $10,000 res., Highfield & John St.; $4,000 res., 58 Portledge Ave.

Monteith, Ont.

Toronto Elec. Co., 101 Duke St., Toronto, $38,000 school, Northern Academy.

Montreal, Que.

Wm. Rochon, 454 Lafontaine Park., $50,000 biscuit factory.

Sayer Electric Co., 87 Bleury St., bank 1950-4 St. James St.

Smith & Goodchild, 128 St. Peter St., $12,000 alt., store, St. Catherine & McGill; $12,000 alt. school, 516 Delisle St.

Vincent & Say, 344 Union Ave., $10,000 alt. res., 838-40 Lorne Cres.; $7,000 store, Montclair Ave.; $10,000 res., 901 Queen Mary R.

Acme Electrical Co., 1012 A Laurier W., $85,000, 10 stores, St. Catherine St., W.

A. L. Allard, 162 Mt. Royal E., $55,000 apt., Vendome & Sherbrooke Sts.; $22,000, 3 res., Wilson Ave.

Cable—Philip Lahee & Co., 3 St. Nicholas St. for $575,000 reservoir.

E. Choquette, 2090 Park Ave., $6,000 res., Waverley St. Wolsey Ave.

Geo. Shearington, 3186 Park Ave., $16,000 pr. s. d. res.,

B. Gregory, 55 c. Metcalfe St., $7,000 res.; $15,000, 2 res., Connaught St.

E. Miller, 141 Notre Dame St. Lachine, $9,000 cottage, Ballantyne Ave.

Uptown Electric Co., 926c St. Catherine W., $25,000 2 stores & 2 apts., Westminster & Milner.

North Bay, Ont.

Dingle & Alger, $2,800 res., 3rd. St., E.

Herbert & Co., $5,000 res., 2nd. Ave., E.

Ottawa, Ont.

P. Ackroyd, 416 Bank St., $5,000 res., Cobalt Ave.

H. L. Allen, 272 Bank St., $110,000 stores, Dalhousie St.

Mr. Chugg, $6,000 res., Grove Ave.; $5,500 res., Grove Ave.

A. Davis, LeBreton St., $5,000 res., Grove Ave.; $7,000 res., Carling Ave.; $5,500 res., Grove Ave.; $4,000 res., Wellington St.

E. Headly, 645 Echo Drive, $20,000 store & apts., Bank St.; $15,000 apts., 2nd., Ave.

(Changed) Mr. Lennox, $10,000 res., Willard St.

Mr. McLelland, $5,500 res., Bronson Ave.; $6,500 res., Bronson Ave.

Stan Lewis, 63 Metcalfe St., $10,000 nurses home, Aylmer Ave.; $10,000 dup. res., 1st Ave.

W. J. Stewart, Daly Ave., $5,000 alt. res.

Oakville, Ont.

B. E. Sprowl, $10,124 res., Watson Ave.

D. J. Sullivan, $5,500 res., Spruce St.

Outrement, Que.

A. Boismenu, 391 Belanger St., $14,000 cottage, Bloomfield Ave.; cottage, St. Viateur.

Geo. Shearington, 3186 Park Ave., $7,000 cottage, 554 Davaar Ave.

Regina, Sask.

Lorne Electric Co., 820 Smith St., $4,000 res., Dewdney St.

St. Boniface, Man.

T. W. Price, 33 Fawcett Ave., Wpg., $32,900 church & rectory, Oak & Dubuc Sts.

St. Catharines, Ont.

R. L. Roxborough, 27 Wellington St., E. Toronto, $600,000 collegiate, Catherine & Woodland Streets.

J. Desand, 187 St. Paul St., $2,500 res., Ontario St. Highway,; $4,000 res., Queenston St.

F. C. Crawford, Ottawa St., $3,500 res., Chaplin Ave.

H. C. Holmes, 30 Ann St., $3,500 res., 30 Albert St.

Sault Ste. Marie, Ont.

Greenwood Electric Co., 812 Queen St., E., $5,500 res., Borron Ave.; $2,500 warehouse.

St. Thomas, Ont.

St. Thomas Hydro, St. Thomas, $25,000 gym., Alma College.

Stratford, Ont.

Cook & O'Donoghue, Downie St., $3,500 res., Elizabeth St.

W. Gaul, Charles St., $4,500 res., Cambria St.; $3,600 res., St. Vincent Street.

Sudbury, Ont.

J. J. Martin, Capreol, Ont., $6,000 res., Parir St.

Sussex, N. B.

Vaughan Electric Co., Ltd., 94 Germain St., St. John, $145,000 high school.

Sydney, N. S.

E. D. Murphy, Charlotte St., $20,000 store & offices, Charlotte St.

Toronto, Ont.

J. A. Craig, 20 St. Annes Rd., $15,000 res., Rushton Rd.

R. A. L. Gray, 85 York St., welfare bldg., Fraser Ave.

Lockwood & Jacques, 801 Ossington Ave., $8,000 each, 6 stores & apts. Roehampton Ave.

R. A. L. Gray & Co., 85 York St., $9,000 res., Thorncliffe Blvd.

G. G. Fiegham, 116 Glencairn Ave., $6,000 each, 3 res., Deloraine Ave.

Perrin & Hallam, 258 Laughton Ave., $150,000 apt. house, King W.

M. Price, $18,000 res., 14 Northcliffe Blvd.

Canada Electric Co., 175 King E., $100,000 school, Bowmore Rd., Contract Price $1,905.

Verdun, Que.

Vincent & Say, 344 Union Ave., $55,000 church.

Victoria, B. C.

Hawkins & Hayward, 1103 Douglas St., $15,000 add. stores, Douglas St.

Murphy Elec. Co., 603 Sayward Bldg., $10,000 res., Tyndale Ave., Gordon Head.; $5,000 res., 1528 Monterey Ave.; $5,100 res., 1326 Manor Rd.

Sun Electric Co., 643 Yates St., $93,000 building, Government & View Sts.

A. B. Whitman, 2020 Chaucer St., $3,500 alt. apt., 1176 Yates St.

Waterloo, Ont.

Otto Reiber, 50 Queen St. N., $4,000 res., King & Spring Sts.; $5,000 Noecker St.

Westboro, Ont.

Stan Lewis, 63 Metcalfe St., Ottawa, $50,000 collegiate, Broadway Ave.

Westmount, Que.

H. E. Cassidy, 255 Regent Ave., $4,000 garage, 561 Roslyn Ave.

Vincent & Say, 344 Union Ave., $20,000 building, Sunnyside Ave.

Winnipeg, Man.

Electric Engr. Co., 965 Main St., $30,000 school, Magnus & Andrew Sts.

Timmins & Boughton, 338 Robert St., $10,000 res., Waverley St.

Over 1,500 motor car jitney licenses were issued in Buffalo on the first day of the street car strike.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada.

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ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Starts Nowhere—Ends Nowhere!

The electrical industry is, in fact, a very complete, compact organism. To the visitors at the great "Fair" however, it must appear entirely disjointed and disorganized. It is everywhere and yet it is nowhere. Every other industry is dependent upon it, yet electricity gets no credit—no "kudos."

The so-called electrical building is almost a joke. It gives the visitors an entirely erroneous idea of what electricity really means. The building itself is unsuited to the needs of the industry and it is badly located. The electric (?) sign over the entrance would be about suitable for an Italian shoe repair shop. Poor judgment has been exercised in the selection of exhibits; for example, one of the most prominent booths is occupied by a lightning rod man whose noisy demonstrations consist in producing some spectacular miniature lighting flashes. These have not the slightest meaning for the open mouthed spectators, who carry away the idea that electricity is chiefly a matter of flashes and sparks and "terrible dangerous" as one old lady remarked. This exhibit is entirely out of place.

Then, only a small fraction of the electrical exhibits are found in this building. The attractiveness of other buildings is so much greater, and the environment so much more productive of interested inquiries, that a very large number of firms, while quite sympathetic with the general idea of segregating the electrical industry, yet feel that they cannot afford to give up locations they have held before, in some cases for years, until something better than the present electrical building is provided elsewhere.

We understand the secretary of the electrical manufacturers' Association is making a move to determine the viewpoint of the members on the matter of a new building for next year. The problem does not appear to be a difficult one. The management of the exhibition has definitely stated that all they require is a guarantee over a term of years that the full space will be occupied. They are then prepared to provide the money and go ahead with the erection of a building—anything the industry wants, practically. Unless we lack faith in our own industry and its future development we surely need not hesitate to look forward far enough to guarantee occupying as much space at the Canadian National Exhibition for the next ten years as we occupy to-day. Unless all signs fail, the end of that period will actually see us demanding many times the present requirements.

There is little doubt that the idea of a new and permanent building, centrally located, will appeal to all manufacturers and wholesalers. That being the case the next thing is **action.** Some one person or a small committee, should be specially charged with preliminary negotiations, preparing plans, etc. If action is taken at once we can have our own home next year. The Electrical Industry surely cannot afford to remain longer in disgrace.

All Together For 1923!

Shall we have an Electrical Building in the Big Canadian National Exhibition next year? The electrical manufacturers are moving in that direction and Mr. J. A. McKay, their general secretary, has sent out a questionnaire. All the replies are not yet received but it looks like a big majority vote in favor of going ahead at once.

In addition to other arguments in favor of immediate action is the fact that available space for building on is being rapidly taken up. A good location is important. Mr. McKay's letter—containing interesting information—and his questionnaire, is given below:

Re: Canadian National Exhibition

Dear Sirs:—

It has been the concensus of opinion of all engaged in the electrical industry, be it as Manufacturer, Jobber, Contractor-Dealer or from the Central Station point of view, that the present facilities provided at the Canadian National Exhibition for the housing of exhibits, etc., have in view of the importance of the industry, been very inadequate during recent years.

Representatives of the industry recently approached the Exhibition authorities on this subject and were informed that if at any time the industry as a whole showed that it was ready to support the Exhibition authorities if a suitable building were provided, they, the officials, were prepared to proceed with the erection of such a structure on a proper location. The representatives were further informed that on the cost basis of other buildings recently erected, a building in keeping with the needs of the industry could be erected on the basis of an assured rental of approximately 65 cents per square foot per annum.

Mr. A. S. Edgar of the Canadian General Electric Company, Mr. C. H. Keeling of the Square D Company, and Mr. A. MacKenzie of the Canadian National Carbon Company have recently been appointed a Committee to obtain the views of the members of the different branches of the industry, and in order to obtain a complete survey, have prepared a questionnaire, copy of which is herewith enclosed, and which you are respectfully requested to complete and return to the office of the Electrical Supply Manufacturers' Association, 24 Adelaide Street West, Toronto.

If sufficient interest is shown in the matter, it is intended to have a Main Committee formed which will be representative of all branches, to carry negotiations to completion.

If our plans carry it is proposed to incorporate in the building a Model Electric Home which will be operated by the Electric Home League, and which will remain a permanent feature, and to which proper publicity will be given. This, in itself, will serve as a permanent attraction and incentive to all who attend the Exhibition to visit the Electrical Building.

It has been suggested that 1923 should be "Electrical Year" at the Exhibition, and therefore, the erection and opening of the new Electrical Building during the Exhibition of 1923 will be most opportune.

Yours very truly
J. A. McKay
General Secretary

Questionnaire

1. Do you regularly exhibit at the Canadian National Exhibition
2. If not, have you ever exhibited?
3. If you did not exhibit in 1921, when did you last make use of space?
4. (a) Give approximate area of space used during the last Exhibition at which you were represented.
   (b) Rent per square foot paid.
5. If an exclusive Electrical Building is erected on a suitable location for opening in 1923, how many square feet at an annual rental of 65 cents per square foot for a term of ten years could be made use of by you.

(A reply to this question does not in any manner obligate you.)

Name....................................

Address...................................

Date..................

Annual Financial Review

The Annual Financial Review (Canadian) for the year ended June 1922 has just been issued by Messrs. Houston's Standard Publications, Stock Exchange Building, 84 Bay Street, Toronto. To the man or woman who has money to invest, whether in large or small amounts, this is a publication that may well pay for itself many times over during the year, for it is a carefully revised precis of facts regarding Canadian securities. The information contained includes the latest annual statements of banks. railways, public utilities, industries of every sort, loan and mortgage companies, mines, etc. Lists of bond and brokerage houses are also given, with the standard charges for buying and selling. In addition to the annual report of each company, there is also printed in nearly every case the record of the buying and selling transactions in the different stocks for a number of years, thus giving the investor an opportunity to judge, at a glance, whether the past history of a stock is such as to make it a suitable investment for his particular needs.

Contrary to the opinion held by most inexperienced investors, comparatively few fortunes are the result of speculation. Insurance companies tell us that 95% of our population are more or less dependent upon their relatives in their old age; this in spite of the fact that perhaps 50% of our people have developed in a greater or less degree the saving habit and have placed their money at one time or another in what they believe to be "investments." The secret of old age dependence must, therefore, be due to the lack of knowledge about investments. For these reasons, it would appear that no person with money to invest could do better than pay $10.00 for a copy of this Annual Review and make a careful study of its contents. If an investor has large quantities of money at his disposal this expense represents an infinitesimally small portion of the savings that may be effected through accurate knowledge. For the small investor, who's all is counted in thousands. it goes without saying that a high factor of safety is of prime importance.

Interesting Contract with Charleswood, Man.

An interesting contract has recently been closed between the municipality of Charleswood, Manitoba, and the Suburban Rapid Transit Company, a subsidiary of the Winnipeg Electric Railway Company, whereby, three of the four wards of the municipality will be served with electric lighting facilities immediately; the other ward, which is purely rural, will be connected up as soon as developments justify.

The municipality as a whole is rather more rural than urban, and although only the Assinaboine River separates it from the municipalities of St. James and Assinaboia both of which for years have had a comprehensive distribution system, it was not commercially feasible for the company to extend into Charleswood without assistance of some kind.

It is undoubtedly true that whenever, and wherever, a pole line extension is made, the property along the route is materially increased in value; but unfortunately the company or institutions making the extensions, and directly responsible for increasing land values, are not in a position to capitalize on such increasing values even to offset the deficits that very often exists for years after extensions have been made.

The company realized in this case, that for a considerable time deficits would be made unless the expense of the distribution costs could be shared, and that it is the municipality itself that is in the logical position to share in the intial expense by virtue of its being in a position to capitalize on increasing land values. The Council of the municipality were asked to agree to a scheme of joint ownership of the distribution system within the municipality. This they agreed to do, and signed a fifteen year contract subject to renewals for further periods of ten years each.

According to the contract the company undertakes the erection of all the work, but the municipality pays the company for all the labor and materials involved in the pole line (poles and conductors) charging the cost of same to the property owners under a local improvement scheme, the company being responsible for furnishing and placing in position all transformers, services and meters, also the maintainance of the whole system.

This joint ownership period lasts for five years from January 1st, 1923, thereafter, the company undertakes to purchase the municipality's portion of the system and to refund the money gradually but without interest until after two years from the date of purchase. It was felt that as the municipality had certain attractive features about it—geographically it is in the direction of probable developments, the taxes are unusually low and together with future extensions being regulated on a basis of a customers "per pole" in about five years time the system would be on a self supporting basis.

Among other interesting details of the contract for which Mr. Duncan G. Sutherland, power sales engineer for the company was responsible, is a clause to the effect that in the event of the contract not being renewed with the company after the first fifteen years or any renewal period, and the municipality desires to go into the business of furnishing electrical current for itself or permit any other firm or corporation to do so, the system at the option of the company must be bought out right by the municipality.

Opening of Galt's New Hydro Home

Sir Adam Beck Says Building Among Finest of Hydro System—Sub-station Part of Structure

An interesting event in the electrical world and one that further indicates the progress of hydro-electric development, has been the opening of the new building of the Hydro-electric Power Commission in Galt, Ontario.

The chain of events leading to this successful conclusion may be said to have commenced in 1886, when one of the first arc lighting systems on the continent was installed on the streets of Galt. House lighting was started on a small scale a few years later, and various extensions and improvements were carried out by the private companies operating this utility in the succeeding years. "Hydro" first came to Galt in 1911, and the first power bill paid by the municipality was for 93.9 horse-power, amounting to $195.00. The power bill for June, 1922, amounted to $6,883.80.

The steadily growing demand made it imperative that the sub-station, offices and merchandising section be centrally housed in a suitable building, with the result that the new Hydro building was erected.

Building Most Modern

The Public Utilities building is said to be not only the finest in the city of Galt, but also one of the finest in the Hydro system, combining all the most modern ideas in buildings for this purpose. The design of the exterior is what is known as the straight style—stone ornaments and the large show windows of the office building providing relief. The building is three stories in height throughout, of Ohio sandstone and brick construction, with the foundation of concrete and Queenston stone. It is the first all steel office structure to be erected in the district, with reinforced concrete floors and all of the interior construction carried on the steel frame work.

The office section of the building is entirely separate from the sub-station, the two being divided by a solid fire wall, with a stairway and elevator between the two departments enclosed in fire walls. The two sections are connected by fire-proof doors and each section has its own entrance.

The basement of the building provides work shops for the waterworks and electrical departments, space for the rotary converter and storage batteries for the operation of the sub-station switch gear and for the heating plant for the building.

Appliance Section

The double entrance to the office section from Wellington and Dickson Streets, opens into a good sized vestibule which is in walnut finish. This leads into the show room and main office. This room is finished with a dado of grey marble, light grey stucco walls and an ivory tinted cement beamed ceiling. The floor is of Terrazzo with a ceramic tile border. The interior wood trim is in walnut finish with show-room fixtures and main office grill to match. The lighting is from Duplexalite fixtures.

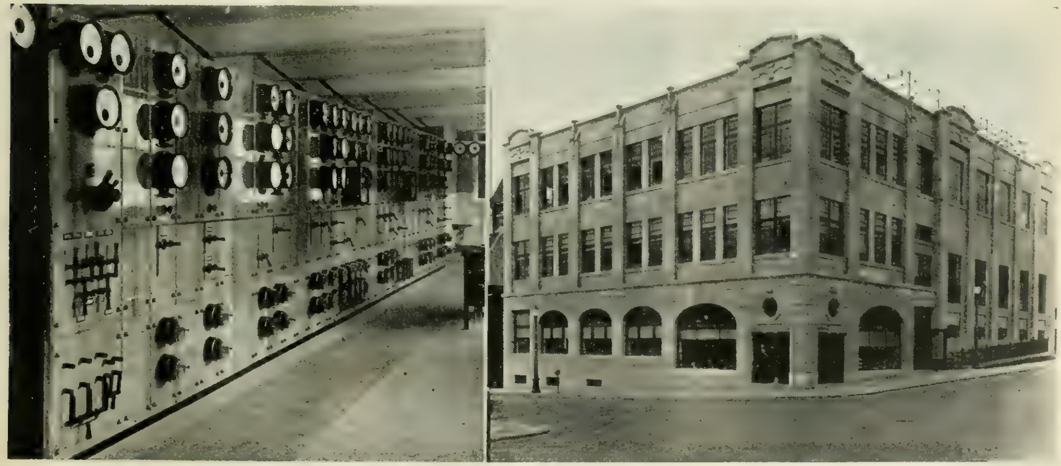
As will be seen from the illustration of the show room, the appliances are placed with sufficient display space for each—no overcrowding is allowed. The development of this department only dates from 1921, and the venture has been very successful. At the present time "wiring" alone occupies seven electricians. The demand for electric ranges is especially noteworthy, over 300 being sold last year. The total investment in the retail end amounts to about $42,000.

The Second Floor

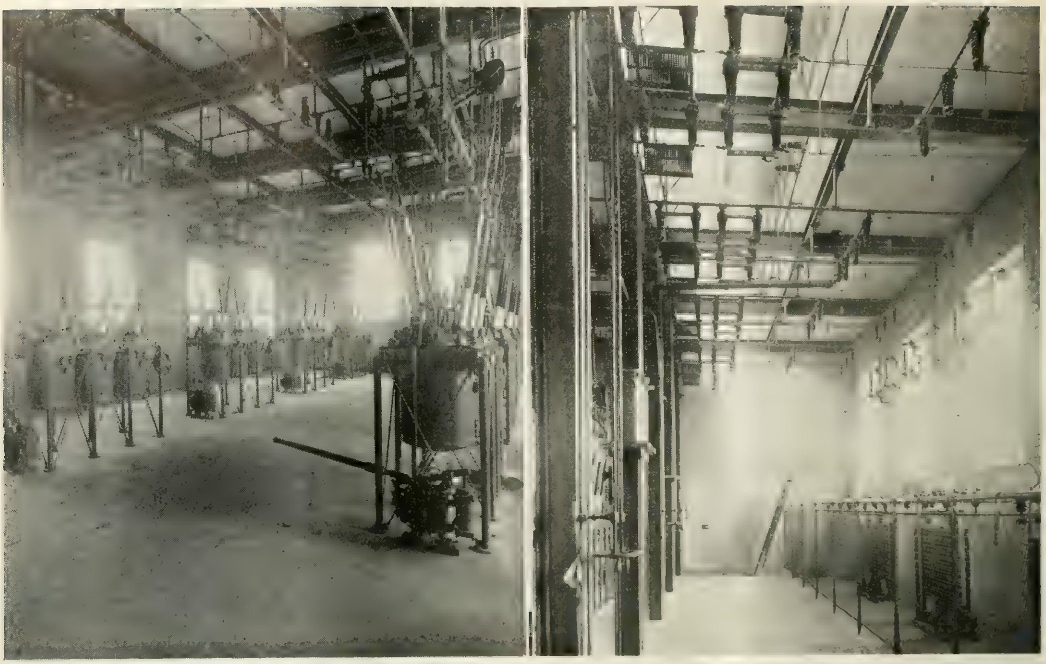
On the second floor are the offices of the manager, the assistant manager, and the Board room. The finish on this floor follows the same general scheme used on the ground floor. The third floor is left unfinished, and is used for storage of electrical appliances and wiring equipment.

The Sub-station

The main sub-station is incorporated in the building and is entered from Wellington Street. Power is received at 13,200 volts from two three phase transmission lines which enter from the roof. Two 13,200 volt, three phase lines from this station feed other local sub-stations. While the present



Right—A view of the Galt Hydro building that indicates its substantial character. Left—The main switchboard; 31 marble panels



Left—High tension oil breakers, bus bars and current transformers. Right—Incoming 13,200 volt lines and arresters

high tension voltage is only 13,200, it is anticipated that at some future date this will be increased to 26,400 volts and accordingly all high tension equipment has been designed for use at the latter potential.

Four three phase transformer banks are installed, three of which have 2,200 volt secondaries, the fourth being 550 volt secondary.

In-coming Lines

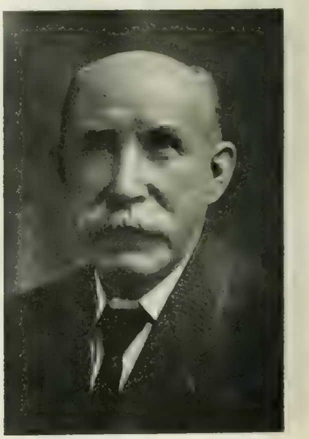
The in-coming 13,200 volt lines, arresters, disconnecting switches and choke coils are shown in one of the figures and another photo shows the high tension oil circuit breakers and bus bars, current transformers, disconnecting switches etc. The arrangement adopted, of suspending all pipe structure from the roof steel and bracing to column, has resulted in a very clean cut layout.

Emergency 2,200 and 550 volt buses are installed and all feeders are equipped with double-throw disconnecting switches so that in the event of trouble on the main bus or circuit breakers, the feeders can be thrown directly onto the emergency bus.

All circuit breakers are electrically operated from the main switchboard which is located on the ground floor. The

A. B. Scott, Secretary-Treasurer
Public Utilities Commission

W. H. Fairchild, Manager
Public Utilities Commission



Robert Elliott, Assistant Manager
Public Utilities Commission

switchboard consists of 31 panels of polished blue vermont marble and is 36 feet in length.

The installation is very complete in every respect and reflects great credit on the engineers of the Galt Public Utilities Commission.

The entire switching equipment with the exception of the lightning arresters was furnished by the Canadian Westinghouse Company. The arresters were provided by the Canadian General Electric Company.

Work Done in Galt

The complete building as it stands cost $160,000 while the electrical equipment entailed an expenditure of $60,000 making the total cost $220,000. The work of removing the buildings that previously occupied the site commenced in April 1921, and the building was occupied on July 3rd last. Manager W. H. Fairchild was in sole charge of construction and all materials, in-so-far as possible, were "Made in Canada." The electrical arrangements were worked out under the superintendance of assistant manager Robert Elliott, to whom a large share of the credit is due. Ample provision has been made for the installation of additional equipment as the future growth of the load in Galt may warrant.

The executive staff who were responsible for the work consisted of Messrs. W. H. Fairchild, manager; Robert Elliott, assistant manager and A. B. Scott, secretary-treasurer. Galt Public Utilities Commission is composed of Messrs. G. Turnbull, chairman; R. B. McGregor, G. Hancock, Jr., A. W. Mercer and Dr. S. E. Charlton, mayor of the city.

Appliance Show Room of Galt Hydro building—Windows are of generous size and illumination thus provided is supplemented with 18 Duplexalite units—Each appliance is given plenty of space for display purposes—the sale of over 300 ranges in one year testifies to the soundness of the merchandising policies followed.

Power Plant at Thessalon

Contracts have just been awarded for the construction of a small power plant at Thessalon, to be known as the Thessalon Power Development. The complete work calls for a concrete dam, 390 feet of 48 inch wood stave pipe line, and a concrete power house. The equipment will be operated under a head of 40 feet. The capacity of the plant will be in the neighborhood of 200 h.p. The dam is being constructed by Messrs MacNamara at a cost of $15,300. The turbine, generator and direct-connected exciter will be installed by the William Kennedy & Sons, Owen Sound, Ont., at a cost of $9,200. James, Proctor and Redfern Ltd., are the engineers.

Province Loses Valued Commissioner

Mr. Fredrick R. Miller, prominent engineer and contractor of Toronto, died at the Victoria Memorial Hospital in that city a few days ago. Mr. Miller had been ill since June, having undergone two operations in that time for stomach ailments. He was born in 1878 in St. Catharines, Ont., and passed his early life in Ingersoll, Ont., being educated there at the public and high schools, prior to coming to Toronto University, from which he graduated in engineering. He served from 1902 to 1909 with the firm of Haney and Miller, leaving them to become manager of the Port Credit Brick Company. In 1910 he joined his father's firm, Roger Miller & Sons, as a partner, and became vice president in 1917. Other of his business affiliations were his position as president of Owens and Elmes, Limited, and his position as vice-president of Claburn and Company, Limited, of Vancouver, fire brick manufacturers. Many of the engineering works in Toronto are testimonies to his skill in his profession. He executed many of the Harbor Commission contracts, built the new intake pipe and also erected the sea wall. He first notably entered public life during the period of the war when in 1916, he took charge in the Toronto district of the production of munitions for the Imperial Munitions Board. So successfully did he function in this capacity that his jurisdiction was increased to include the whole province. Later he was appointed by the Imperial Munitions Board to become vice-president and general manager of the British Forgings Company, Limited. In all these positions he served the Government entirely without recompense. He was a member of the Hydro-electric Power Commission of Ontario and of the Toronto Transportation Commission, having supervised the extensive program of rehabilitation work carried out by the latter body last year. He was an ardent enthusiast for motor boating, motoring and golf and was the owner of the motor boatsHeldena I., Heldena II., and Heldena III., the latter winning the International Gold Cup Trophy at the Exhibition races last year. He was a member of the R.C.Y.C., honorary commodore Parkdale Canoe Club, past commodore Toronto Motorboat Club, and member of the Eglinton Hunt, Engineers, Mississauga Golf, Ontario, Albany and Old Colony Clubs, and of the Rideau Club, Ottawa. He had served on the executive of the American Power Board Association.

Toronto Transportation Commission New Cars of Improved Design

Aside from the heavy work undertaken in the improvement of the road-bed, and the purchase of 250 new cars some months ago, the Toronto Transportation Commision is further improving and speeding up the service by the addition of more motor cars and trailers. 200 new cars have recently been ordered, 100 of which are motor cars and 100 trailers.

Particular interest attaches to the design of the new trailers. Those already in service are of the centre entrance and exit type, single doors being operated by a short space, which is occupied by the conductor's stand. When these trailers are used with motor cars having double door entrance and exit, there is a tendency to delay, owing to the narrower doors in the trailers, because the capacity of the motor cars and the trailers is practically the same. The single door arrangement also seems to tend to cause passengers to instinctively avoid the trailer, on the supposition, presumably, that there will be more delay in boarding or alighting.

In the new trailers this difficutly has been overcome, by a door arrangement worked out by the assistant general manager of the Toronto Transportation Commission, Mr. D. W. Harvey. By the addition of a third door at the centre and a flexible arrangement by which the third door may be used either for entrance or exit, depending on traffic requirements at the moment, the time of loading and unloading will be speeded up and made comparable with that of the double door entrance and exit motor cars. The features of the new trailers are explained below in somewhat more detail.

Three Door Feature

The new trailer differs from those now in service in that it has three doors instead of two now used, the odd door being in the centre. The door on the extreme left, entering, is always an exit door, that on the extreme right always an entrance door, but the centre door may be used either as an exit or an entrance, though not both at the same time.

Inside the centre door is a movable barrier, see figure. When the conductor wishes to use the door as an exit, the barrier is swung at right angles to the centre of the car. The passengers in the forward part of the trailer can then file past the conductor, pay their fares and secure transfers as they leave, without interfering with the unloading of passengers in the rear of the car, who have previously filed past the conductor on their way to the rear seats and paid their fares. When the barrier is swung back along the centre line of the trailer, the door becomes an entrance to load the car.

Adapted to Heavy Traffic

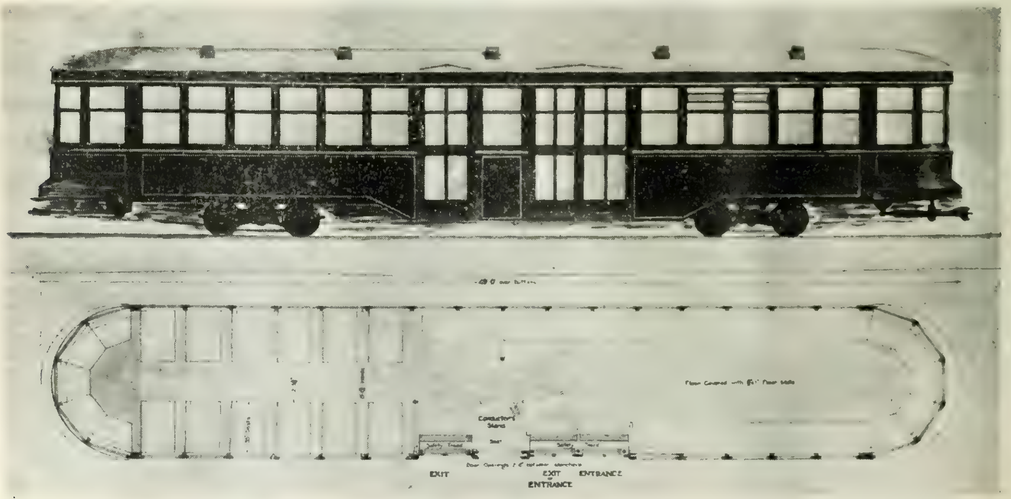
Explaining the design of the car Mr. Harvey said it was adapted to heavy traffic routes. When it was travelling in an area in which the great majority of the passengers wished to board, the centre door would be used as another entrance; when the trailer was coming into the area at which the passengers wanted to alight, and conditions were reversed, the conductor would swing the barrier and use the door as an exit. This made the cars more flexible and would greatly speed up the handling of the rush-hour traffic.

Delivery Starts in November

The Canadian Car and Foundry Company, of Montreal, is building the 100 trailers, and the first ones will be delivered in November. This company is also building 50 of the motor cars, and the Ottawa Car Company will build the other 50. These cars will be delivered approximately the same time as the trailers.

New Motor Cars

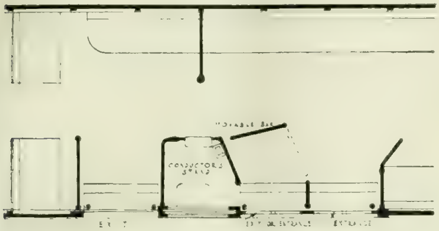
The new cars are of the Peter Witt type, but have some special features. They are one window length shorter in both the front and rear ends, being 47 feet long as com-



Trailer Equipped with Harvey Patent Feature pared with the 52 feet of the earlier cars. They are equipped with four 35 h.p. motors and are not designed to haul a trailer; it is the intention of the commission to use these cars on lines of medium or light traffic.

One Man Can Operate

Another feature of these new motor cars is that they can be operated either as one or two man cars. The front vestibule is divided by a curved barrier, so that the cars can be converted into one-man "pay-as-you-enter" or one-man "pay-as-you-leave" cars. Normally, of course, the conductor is located in the centre of the car. Each car is capable of accommodating 60 people sitting.



Plan showing Harvey Feature

We understand the commission is not planning the operation of one-man cars at the present time, but, if the necessity for such cars should arise in future, the new motor cars will serve the purpose without added expense.

The entire electrical equipment for the new motor cars as well as the brake equipment for both motors and trailers is being supplied by the Canadian Westinghouse Company.

Winnipeg Grand-Beach Line

Electrification of the Canadian National Winnipeg-Grand Beach line, a distance of approximately seventy miles, is being considered, according to recent reports. Negotiations are under way with the Manitoba Power Company and it is hoped to obtain a low rate for electrical power with a view to establishing the fact that electrification of railways on the Prairies would be feasible and economical.

It is said that Winnipeg's hydro-electric stand-by plant will, in all probability, be located on the site immediately east of Victoria park, and between that park and the river. The civic public utilities committee named a committee of three to investigate the possibilities of the site after considering a report from the city surveyor. The sub-committee will inspect the site and report back to the parent committee with a view to making a definite recommendation to council.

Trade Publications

"Arc Welding in Electric Railway Shops" is the subject of a publication just issued by the Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa. The publication, which is known as Leaflet No. 1824, describes the many advantages of arc welding and gives figures showing the great saving possible by reclaiming worn out parts.

A new illustrated publication, Reprint 118, has just been issued by the Westinghouse Electric & Manufacturing Company, embracing an article by Professor Chas. F. Scott on the subject "The Question of Inductive Interference and Electrolysis as Related to Railroad Electrification."

Montreal Harbor Railway to be Electrified

Electrification of the harbor railway terminals, at present steam-operated and consisting of surface lines with a total trackage of 58 miles situated between the Victoria Bridge and the Imperial Oil wharf, will be completed by the end of September to the extent of about 42 miles of track from Victoria pier east, and the electrical operation of this section will then be inaugurated. The remainder, about 16 miles of track from section 19 westward, will not be electrified until later, according to a statement by M. P. Fennell, general manager of the port. As soon as the first part of the electrification process is completed two electric locomotives will be placed in service, and by degrees the whole of the ten steam locomotives owned by the Harbor Commission will into service will be leased for the purpose from the Canadian be replaced by electrics. The first two of the latter put into service will be leased for the purpose from the Canadian National Railways, but others of a more powerful type and suitable for the heavy work in the harbor terminals will be constructed specially for the commissioners. As the system develops additional electric locomotives will be added as occasion demands. Specifications for the first of the new locomotives are being prepared by T. E. Salter, electrical engineer in charge of the system, but will not be completed until tests have been made with the locomotives leased from the Canadian National Railways.

Advocated by W. G. Ross

Electrification of the harbor terminals was advocated for many years by W. G. Ross, former chairman of the Harbor Commission, and it is largely due to his efforts and progressive policy that this undertaking is now successfully nearing consummation. Early in 1918 the then commissioners realized that traffic on the railway terminals was increasing so rapidly that to avoid congestion it was necessary to procure more steam locomotives or to electrify the system. With the latter idea in view, a number of important electrified freight terminals were visited and conditions closely studied, with a view to obtaining the best possible system for the Montreal harbor terminals.

Electrification Economical

It was found that electrification for freight yards and terminals was everywhere reported upon as being very economical and satisfactory, electric locomotives being considerably more efficient than steam. This is especially true in the winter time. An electric locomotive is also capable of drawing heavier loads up steeper grades, if necessary, than one operated by steam, the former having the whole capacity of the power house behind it, while the latter's power is limited to the extent of its power capacity. The elimination of the smoke and soot evil and the saving of coal were also important items to be considered.

2,400 Volt d.c. System

In view of the climatic conditions and the highly successful operation of the Canadian National Railway lines through the Mount Royal Tunnel terminals, which have a 2,400 volt direct current overhead system in use, it was decided to adopt a similar system for the Montreal harbor terminals. Work on the electrification commenced on September 22, 1919, and continued until August, 1921, when it was suspended for almost a year owing to lack of the necessary funds. It is now being rapidly pushed to completion.

Correction

In our issue of September 1st, under the heading "Diesel Plant at Ft. Saskatchewan" it was stated that the Provincial Government of Saskatchewan would install an electric plant operated by Diesel engine at the Provincial Jail in Fort Saskatchewan. This should have read the Provincial Government of Alberta.

Definitions and Tests for Electrical Insulating Papers

The Findings of a Special Committee of the Electrical Research Association of England—Basis for Acceptance Tests

In view of the fact that up to the present, in Canada, there have been no universally accepted tests or definitions relating to electrical insulating papers, the findings of a committee which has made a special study of these materials, will be received with interest.

The work has been carried out by the Electrical Research Association of England, and is a continuance of studies initiated by its predecessor, the Electrical Research Committee.

Those papers which are employed in the construction of cables were not studied. Extensive research on other varieties, however, was carried out, and finally, after collaboration with the manufacturers, a series of definitions and tests was laid down. It is believed that these are conservative and inclusive and will serve as a basis for the development of acceptance tests.

Definitions

Pure Manilla Fibre Paper.—Paper made from Manilla fibre only. The best is made from new fibre.

Manilla Paper.—A strong paper made from sulphite wood pulp. May contain some Manilla and hemp fibre.

Rope Paper.—Paper made from rope ends.

Sulphate, Sulphite and Soda Wood Papers.— Papers made from wood pulp only by the sulphate, sulphite and caustic soda processes respectively. Known collectively as chemical wood pulp papers.

Mechanical Wood Pulp Paper.—Paper made from wood

Jute Paper (Horn Fibre Paper).—Paper made from jute

Jute Paper (Horn Fibre Paper).—Paper made from jute fibre only without the use of chemicals.

Soda Rag-pulp Paper.—Paper made from rags only by the caustic soda process.

Lime Rag-Pulp Paper.—Paper made from rags only by the lime and carbonate of soda process.

Rag Bond and Rag Bank Paper.—Paper made from linen and cotton rags only and weighing not more than 13 lbs. per ream (480 sheets), post size (21 in. by 16½ in.).

Leather Paper (Fish Paper).—Paper made from cotton rags only and afterwards chemically treated (generally with zinc chloride) to produce a homogeneous sheet of celluvert.

Tissue Papers.—Papers of which the weight of 2,000 sq. ft. does not exceed 9 lb.:

Best Rag Tissue (Condenser or Electrical Tissue).—Made from rags only. The heavier grades are known as electrical tissue.

Cotton Tissue.—Made from cotton rags only.

Silversmiths' Tissue.—Made from rags only, grass bleached, and free from chemicals and loading materials.

Sulphite Tissue.—Made from wood-pulp by the sulphite process. May contain rag pulp.

Sulphate Imitation Japanese Tissue.—Soft porous tissue paper made from wood-pulp by the sulphite process.

Japanese Tissue.—Tissue paper made in four grades known as Gampi, Kodzu, Tosa Dental, Mino Dental differing in quality according to fibre, method and locality of manufacture.

Tests Recommended

The tests recommended for the study of electrical insulating papers are as follows:—

Clause No.	Contents
1.	Conditioning.
2.	Thickness.
3.	Density.
4.	Tensile Strength and Elongation.
5.	Ageing. (Bursting Test.)
6.	Tearing.
7.	Porosity.
8.	Chemical.
9 and 10 .	Metallic particles, etc.
11. . .	Crinkling.
12.	Microscopic.

Conditioning.—(To precede all tests under 4, 6, 7 and 8). Single sheets shall be kept in a controlled atmosphere at 75 per cent. relative humidity and 70 deg. F. for not less than eighteen hours, the correct humidity being obtained by the use of dilute sulphuric acid (sp. gr. 1.220), and tested immediately afterwards.

Thickness.—Ten measurements shall be taken equally spaced diagonally across a sample one foot long and the full width of the roll of paper, by means of a micrometer fitted with a ratchet head and measuring faces between ¼ in. and [illegible] in. diameter one of which shall be free to swivel. The maximum, minimum, and mean values shall be stated.

Density.—The density in grammes per cub. cm. shall be taken on samples not more that 8 in. square after 3 hours heating at 212 deg. F.

Tensile Strength and Elongation.—Twelve samples ⅝ in. by 10 in., six in the direction of the paper and six across, shall have a load gradually applied to determine the tensile strength in lbs. per square inch sectional area and the percentage extension on the original length under load.

Ageing. (Bursting Test.)—Tendency to age shall be tested comparing the bursting strength of samples before and after heating to 230 deg. F. for 24 hours. Samples shall be selected as for the thickness test and treated as follows:—

The paper shall be gripped on to a ring leaving a free circular membrane which shall be subjected to fluid pressure until it is broken. The value of the pressure required to break the paper, shown on an indicator attached to the apparatus shall be expressed in lbs. per square inch, which value is defined as the bursting strength of the paper. Maximum, minimum and mean values shall be stated.

Tearing Strength.—To determine the tearing strength, a sample sheet 6 in. square is clamped in a sliding wooden frame which can be drawn along between guides by means of a simple winding gear. A 3/32 in. hole is punched in the centre of the sample and the strip on one side of the hole cut through and turned back into a clip attached to a spring balance. Rotating the winding gear draws the main portion of the sheet along and the strip attached to the spring balance tears away while the balance registers the force required. Maximum, minimum and mean values both for "length" and "width" shall be stated.

Porosity.—For this test the sample is clamped between two metal discs with recesses 1 in. diameter on the faces next to the paper. The upper recess is open to the air and the lower one connected to the upper end of an inverted 100 cub. cm. glass burette supported in a retort stand. By means of an aspirator bottle which is connected through a rubber tube to the lower end of the burette, the water level in the latter is raised to the zero mark near the paper clamp, and the stop cock closed. The aspirator is then lowered to a second fixed position so that the water level is 24 in. below the burette zero, and the stop cock opened for fifteen minutes. Air is thus drawn through the paper sample and the fall of level in the burette, in cub. cm., is a measure of the porosity of the sample.

Chemical Tests

Moisture Loss on Drying at 212 Deg. F.—A sample weighed after conditioning is dried at 212 deg. F. for 3 hours and re-weighed. The moisture loss shall be computed as a percentage of the conditioned weight before drying.

Test for Acidity and Alkalinity.—Weigh off duplicate 200 c.c. distilled water to each. Boil for 20 minutes, wash lots of 10 grammes each into quarter-litre flasks and add with warm water and test with methyl orange. .

If alkaline, titrate with standard centinormal sulphate acid.

If acid, titrate with standard centinormal sodium hydrate or potassium hydrate.

In each case the number of c.c. of the regent required to neutralize the paper shall be stated.

Mineral Ash.—Completely ignite a dry sample from test 8 (a) with all precautions against loss. The amount of the incombustible matter shall be computed as a percentage ot the dried sample.

Sizing Tests.—The total resins in the size shall be determined on five gramme samples of paper by extraction with acidulated alcohol, and the nitrogenous material on gram. samples by the Kjeldahl-Gunning† method.

Chemical Tests for Metallic Particles.—The paper is immersed in a potassium ferrocyanide solution after saturation in dilute hydrochloric acid when each iron particle will produce a blue spot on the paper.

The application of a 1 per cent. solution of silver nitrate to the surface of the paper will produce a black spot on each metallic particle.

The paper is dropped into a 1 per cent. solution of acetic acid and allowed to air dry for one hour lying flat on a cloth. The sample is then dropped into a solution containing 0.1 cub. cm. acetic acid and 0.1 gm. of potassium ferrocyanide in 100 cub. cm. distilled water. The iron particles will appear as blue spots and the copper, brass and gunmetal as red spots. The number of particles per square foot to be stated.

Flash Test for Conducting Particles.—The paper is drawn at a speed of 2 ft. per min. between a metallic plate and brass rollers 3 in. long and ⅞ in. diameter each exerting a pressure of about 10 oz. on the paper under test. An alternating potentian difference of 50 V (50 cycles)* per mil thickness of paper is applied between the roller and plate and the number of punctures per square foot noted.

Crinkling Under Tension.—This is sometimes an important factor but further information is required before this clause can be drafted.

Microscopical Examination.—This test is for the purpose of identifying the constituent fibres of the paper.

Ten specimens each the size of a sixpence from widely distributed positions in the samples are torn up and boiled for a few minutes with about 20 cub.cm. of 0.5 per cent. solution of caustic soda. After draining and repeated washings in tap water the paper is then washed with about 20 cub. cm. of 0.5 per cent. solution of hydrochloric acid and again washed with tap water. A "pill" of the paper is made up and shaken in a test tube half filled with water until it disintegrates into fibres. A small quantity is then removed to a g'ass slide and after partial drying with filter paper two or three drops of zinc-chloride-iodine stain are placed on the fibres teased out with steel needles.

Composition and Preparation of Zinc-Chloride Iodine Stain

25 cub. cm. saturated zinc-chloride solution at 70 deg. Fahr.
5.25 gm. potassium iodine.
0.25 gm. iodine.
12.50 gm. distilled water.

Thelast three ingredients are mixed together, the zinc chloride added, and after settling overnight the supernatant liquid decanted off. The stain must be kept away from light and air.

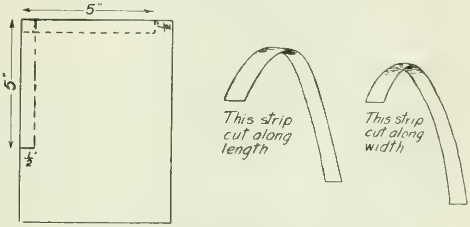
Under the microscope, using this stain and a magnification of 50 diameters the fibres appear colored as follows:—

Cotton and linen rags Cooked and bleached Manilla	Wine red.
Cooked and bleached wood-pulp Cooked and bleached straw and esparto	Blue to blue violet.
Mechanical or ground wood pulp Jute, uncooked, and Manilla Highly lignified fibres	Yellow to lemon yellow.

The shapes and markings of the fibres as well as the colors should be considered in the estimation, and care should be taken to have apparatus and fingers free from fibres before beginning the preparation of a sample.

Appendix

Determination of "breadth" and "length" of paper.—Two strips ½ in. width by 5 in. long are cut at right angles to one another from the sample submitted. By holding them vertically between the thumb and finger so that they fall over it will be found that the one which appears to be more rigid, i.e., stands the higher is the one cut along the "length" of the paper.. The other is cut along the "width."



Determination of length and width of paper

Schedule Indicating Uses of Paper

Uses	Papers in General Use
1. Paper used as Insulation.	Chemical wood pulp.
Manufacture of Tubes and Sheets.	Chemical wood pulp, Manilla, Jute, Rag Bond, Best Rag Tissue.
Between layers of windings and similar purposes.	Chemical wood pulp, Manilla, Jute.
Insulating wrappings.	Chemical wood pulp.
Between punchings.	Mechanical wood pulp.
Condensers.	Condenser or Electrical Tissue.
2. Papers used as Insulation and as Mechanical Protectors.	
Slot Insulation.	Manilla (Red), Red Rope, Jute, Leather.
Wrapping Core Bolts.	Manilla (Red), Red Rope, Jute, Leather.
Bobbin flanges and other parts where high insulation is not required.	Manilla (Red), Red Rope, Jute, Leather.
3. Paper used as a mechanical support in building up Insulating Materials.	
Backing up mica folium mica tape or micanite.	Chemical wood pulp,, Manilla, Japanese Kodzu or Dental Tissue, Sulphite Imitation Japanese Tissue.
Covering for micanite	Sulphite Tissue.

Electricity at the Big National Fair

Can You Imagine the Canadian National Exhibition with Electricity Removed?—It is the Heart and Nerve Centre of all the Activities

One's general impression of this year's electrical show is that the exhibits were more numerous. Several new concerns were represented, and more lines were shown by some of the older firms. An improvement in the dressing of the booths was an encouraging sign. There were very few cases of poorly dressed booths; in fact, most exhibitors seemed to regard their stands as an artist does a picture, and put forth every effort to secure attractive displays.

The large number of electric washing machines was a feature of the show. It would be impossible to say who had the best exhibit, but it is safe to say that the general public could scarcely fail to get some grasp of the fact that to wash electrically is the best way.

A greater tendency to meet the farmer's needs was evinced. Several types of farm lighting and power plants were exhibited, and it was noteworthy that these seem to be made with as little mechanism as possible; low voltage appliances were also featured. The signs point to a great growth of the isolated plant business in the future.

The scattered arrangement of the various electrical displays is unfortunate for the industry. It makes it almost impossible for the public to get a comprehensive grasp of its scope.

We are printing below a few words about each of the exhibits, and regret that their large number makes longer descriptions impossible:

Balmer and Blakely—The booth maintained by this company in the Electrical Building contained some very artistic work. Carver's models and memorials were shown and also some very fine examples of indirect and semi-direct lighting fixtures.

Beatty Bros., Ltd.—Housewives gathered around the Whitecap washer and seemed delighted with the demonstration. Some real washing was done and the salesman in charge was kept busy explaining the operation of the machine.

Bell Telephone Company—A complete switchboard, where the manner of operation was demonstrated, and several booths made an interesting display.

Blue Bird Washer—A machine partly assembled showed the interesting construction of the Blue Bird, and divided attention with one shown in actual operation.

Chas. A. Branston Co.—"There's Music in the Air" was the title affixed to a painted landscape, portraying the broadcasting and reception of music, which formed the back-ground of this company's booth in the Electrical Building. Various types of radio and vibrator sets were displayed. Another booth was maintained by this company, in which the Branston generator was brought more to the front.

Brantford Washing Machine Co.—The distinctive features of the Locomotive washer were well displayed, and an active demonstration was carried on. A glass panel demonstrating machine was used.

William Campbell Sales Co.—The Automatic Rapid Electric Stove was demonstrated by this company. A large show card proclaimed that the stove baked, boiled, stewed, roasted, fried and toasted.

Canadian Drill & Electric Box Co.—A simple and attractive display was put on by this company, comprising three large display-boards, carrying all types of their switch boxes set at the sides and back of the booth, with a large Canadian flag draped in the centre.

Canadian Electric Floor Waxer and Polisher Co.—The fast working and versatility of this company's electric floor waxer and polisher was kept in the public eye by a continuous demonstration. Several sections of floor were shown in different stages of waxing and polishing. The convertible feature of the machine won much approval and many enquiries were received.

Canadian General Electric Company—A combination of artistic arrangement and intelligent demonstration made the booth of the Canadian General Electric Company an attraction for all. The familiar black checked bag of the Premier Vacuum Cleaner was visible in full size and in miniature, and the demonstrator was out to prove that it lived up to its name. Action was also obtained with the Eden Washer, and the great interest displayed proves the value of such a display.

At the **Hotpoint** booth, housewives seemed particularly interested in the products of the electric range, of which a tempting assortment was continually on view. A lively demonstration was furnished with a reversible electric toaster, and other appliances were displayed to their best advantage. A special feature of the exhibit was a bread baking oven, commercial type.

Another C. G. E. appliance display was included in the Stratford exhibit, and added not a little to the brightness of that section.

Canadian Independent Telephone Co.—Many inquiries re the equipment on display proved that the radio craze is not dead. Various forms of telephone apparatus also proved interesting, and the demonstrators were busy.

Canadian Link-Belt Co.—The exhibit of this company comprised a display of the various types of chain used, photographs showing various interesting applications of this form of drive, and an optical device demonstrated the action of the chain when working.

Canadian National Carbon Co.—The booth arranged by this company was equipped with a number of striking display cards, and Columbia Carbons and Eveready batteries were well demonstrated to the public. A good location, good arrangement and able demonstration were combined in this exhibit.

Canadian Wireless Telephone Co.—This display featured a small city set for short ranges. Its compactness and portability proved very interesting.

Caron Light, Water and Power Plant—Any farmer nowadays can have electric power—as was amply shown by the Caron exhibit. A handsome little isolated plant ran continuously at this company's stand and drew much attention.

Century Electric Company—Fans and motors of Century design were shown by the Jones and Moore Electric Co. Various sizes were arranged in the floor, with fans at the rear.

Clements Mfg., Co.—The Cadillac Cleaner was given a

**Convention of Contractors and Dealers
in Toronto, November 13 and 14**

thorough demonstration, and the exhibition of machines and parts proved attractive to many.

J. H. Connor & Son, Ltd.—This company's line of washing machines were actively demonstrated, and the contrast between the fatiguing labor necessary with the old machine, compared to the ease of the electric washer, was well brought out.

Continental Electric Co.—The suction powers of the Royal cleaner were well demanstrated by the striking stunt of picking up ten silver dollars in a row. Catchy selling phrases were painted in cards and placed around the walls of the booth.

Diamond State Fibre Company—The many uses to which fibre can be put were revealed by an assemblage of parts on a display board in the front of the booth. A large vertical showcase illustrated the whole process of manufacture, and interest in the exhibit was heightened by a showing of various fibre products. The booth was well arranged, shrubs being used to give a lighter touch.

Dominion Battery Co.—Besides their general line of dry cells and flash lights, the Dominion Battery Company featured radio batteries in their exhibit. A model aerial added an interesting touch to the display.

Dominion Engineering Agency, Ltd.—Mr. D. M. Fraser was kept busy answering enquiries. The display was interesting and included U-RE-LITE breakers of various sizes, Sundh remote control apparatus, and arrester and disconnecting switch by Schweitzer-Conrad, Robbins & Myers motors and power stand, and rawlplugs. These latter were shown used in materials of such varying composition as glass, slate and plaster.

Dominion Motor Castings—This company exhibited a novel electric washer, embodying a point of special interest to farmers, viz.—construction that enables the copper washing cylinder to be replaced by a churn.

Dowswell, Lees & Co., Ltd.—The Seafoam, New Century and others of this company's line of washing machines drew a good deal of attention. A large size wringer, for power drive, was a feature of the display.

Easy Washing Machine Company—The story of the "Easy Washer" was told by an active demonstration, in which the point of stress was the ease of operation. One machine was placed on a strikingly draped blue dais and drew much attention. A second booth was maintained by this company under the grand stand, and it also proved a centre of attraction, the good looks of the washer being a subject of frequent comment.

Electrical Systems, Ltd.—A copper tub washer, with two motors, was a feature of this display. The Keith refrigerator was also shown.

The Elliott Machinery Company—"My Laundry Maid," a nifty looking washer, was demonstrated successfully. Beltless drive and metal construction are noticeable features of the machine.

Exide Batteries of Canada—The favorable location of this company's factory, just outside the west entrance to the Exhibition induces them to forego the advantages of a booth inside the grounds, and instead to have visitors go through the factory. Mr. Wilkes states that the various processes of battery manufacture were continually demonstrated to many spectators.

Florentine Statuary Co.—From the standpoint of purity of design, and beauty of arrangement the exhibit of this concern was well to the front. Molded floor, table, and hall lamps, lamp-bearing statues, and high class fixtures were shown in pleasing variety.

Globe Engineering Co., Ltd.—The Arctic Air Refrigerator was shown in several sizes, and the demonstrator was kept busy explaining how it did away with the iceman.

Hart Battery Co.—Radio batteries were the feature in the well arranged booth of the Hart Co. In addition, batteries for every power purpose were shown. Mr. C. V. Edwards had a busy time answering enquiries.

Henry Engineering Co.—Radio batteries, Pierce fuses and refills, bell transformers, Shaydolite, Bakelite, Jewell instruments, charging transformers and many other items, made an attractive showing.

Jack Frost Refrigerator—An iceless refrigerator in operation, well-filled with perishable foods, was the feature of this display.

Hoover Suction Sweeper Company—The Hoover display featured a large map showing by means of red-headed pins the location of Hoovers in Toronto. Nineteen machines were exhibited, and one was so placed that a mirror revealed the famous Hoover action. Mr. F. J. Paxton, Toronto manager, proved an efficient demonstrator.

Hurley Machine Company—One of the few dishwashers seen at the Fair was shown in this booth. The Thor washer and ironer were also exhibited and a demonstrating machine with glass plate proved a centre of interest.

Hydro Appliance Co.—Beauty, convenience and safety are claimed for the "Miss Hydro" washer, the latest product of this firm. A special machine with glass top and side was used for demonstrating.

Hydro Booth—Somebody must have put a little real brainwork into the arrangement of the Hydro booth—the exhibit comprised ironing machines, cleaners, ranges, washers, appliances and included active demonstrations, and yet there was no discordant note. This stand was located in the Electric Building but the same might be said of the other Hydro booth, in the Industrial Building, which also displayed a great variety of electrical appliances.

Come to the Convention, Nov. 13 and 14.

Ingersoll Machine and Tool Co.—This booth was the scene of an impressive demonstration of Baby Grand Ironers in action. Nicely ironed laundry was displayed on a clothes rack, and efforts of the demonstrators were ably seconded by snappy slogans around the walls of the booth.

Jewett Radio-Phonographs—The combination of a radio set in a phonograph case, displayed by this company was interesting and attracted much attention.

Lancashire Dynamo & Motor Co.—This booth proved that motors can be shown attractively. The ball-bearing feature was stressed, and sizes up to 36 h.p. were shown. Oil and air starters were included, the latter embracing a non-arcing feature. A disassembled motor showed all the parts, and the well-known Lancashire construction of bringing the motor leads to a central point was demonstrated, the enclosed features being especially noted.

R. A. Lister & Company—A continuous demonstration was carried on of this company's isolated plant. The outfit is engine driven and is furnished with or without batteries.

A. R. Lundy—The Liberty washing machine was given a continuous demonstration, rain or shine.

Mack Storage Battery Co.—The completeness of this company's line was demonstrated by their extensive showing of batteries. A cell cut down to show its construction made an interesting item.

Marconi Wireless Telegraph Co.—Powerful and modern wireless apparatus drew the attention of the wireless fans.

Masco Co., Ltd.—Mr. G. W. Patterson had a lively time demonstrating the features of the A B C washers, running a guessing contest, and generally superintending the booth. The display was very artistically arranged. Enquiries were plentiful.

Maytag Co.—"A Tempest in a Tub" is a phrase used by this company to describe their electric washer, and their exhibit was designed to bear out its truth. One washer was placed in an elevated position, with an inclined mirror over it, and its strong action was thus very well indicated.

Maxwells, Ltd.—The products of this company were exhibited in several booths, and the powerful action of the Mono-Vac washer attracted much attention. A glass-sided tub was used for demonstration purposes.

Edison Mazda Lamps—These were shown in a separate booth, which contained a showcase, and wall-case, with the different varieties. The arrangement, in which ferns were used, was simple and effective.

McClary Mfg., Co.—Electric ranges, hot plates, irons and water heaters formed the basis of this company's display. The range exhibit was particularly striking, every type of the company's manufacture being used. The slogans "Protected Element" and "Seamless Oven" were particularly noticeable.

McDonald and Willson Co.—The booth of the McDonald and Willson Co., in the Industrial Building was remarkable for the pleasing display of fixtures, and the well planned lighting arrangements. Appliances were also exhibited in this booth and among those shown may be mentioned the Trojan washer, Clark Jewel range, Apex cleaner and an electric ironer. Their other booth, in the Electrical Building, was also well fitted with appliances.

John Millen & Son—This exhibit included a display of radio equipment and parts. Station CHFC was shown complete.

Moffatt's Limited—Thirteen types of electric ranges were shown by this company, including heavy duty hotel range and pancake cooker.

D. Moore Company—This exhibit comprised electric ranges, grates and hot plates which were well arranged and demonstrated.

National Electric Heating Co.—An extensive and well arranged display of electric heating appliances drew a great deal of attention. The lines shown included ranges of various types, portable heaters, electric grates and logs. The slogan "Convenience and Economy" was prominently displayed. A housewife was heard to remark that a National Electric range looked to be the last word in cooking devices.

Northern Aluminum Co.—An extensive and well laid out display of utensils in the Industrial Building proved that the domestic uses of aluminum are almost as important as its engineering applications. A large booth maintained by this company was completely filled with an extensive showing of its latest productions.

Northern Electric Company—The Thermo-electric water heater was given a prominent place, and its appearance and performance attracted attention. Radio apparatus, telephone systems, and a small, complete switchboard combined to make up the rest of this display, which proved interesting both to electrical men and laymen. The radio apparatus was well to the front and its arrangement deservedly attracted a crowd. Another display consisted of a receiving set installed on a C.N.R. show train.

H. W. Petrie, Ltd.—Garage and repair machinery was featured by this company, their display including cylinder grinder, drill press, miller and shaper.

Macaulay Pope—An exhibit of historical interest was included in this display, comprising a case of various types of cable which was first shown at the International Exhibition of 1851. The case contained gold medals and other awards, and a piece of gold plated cable from King Edward's yacht, in addition to the lines then manufactured by the Wilkins Co. Present day cables by the same company were also shown in an attractive way.

Prest-O-Lite Co.—A motor-generator set in operation charging farm lighting batteries was an interesting part of this display. A radio set, batteries and their parts were included in the exhibit.

Radio Equipment and Supplies—An indoor aerial and a variety of other appartus drew the fans to this display.

Renfrew Electric Products—A pretty booth and an abundant display of heaters, irons, toasters, grills, percolators, etc., constituted this display. The water pan humidifier was especially advertised.

P. L. Robertson Mfg. Co.—The well-known line of screws manufactured by this company was shown to advantage in a booth located in Machinery Hall. A board was shown in the front of the booth with scores of screws driven in, to show the ease of driving. A manufacturers' electric driver was displayed as a feature, and special brace and spiral drivers for this type of screw were also shown. Other items of this company's line, copper, brass and iron rivets, nails, bolts, wire bale ties, stove pipe wire, drive screws and cut and straight rods, were included in the exhibit.

Salisbury Electric Co.—Farmers are always present at the exhibition in great numbers, and it seemed that a good part of them stopped to look at the Kohler Automatic Power and Light Plant. Its steady running and easy starting made a great appeal.

The Salisbury Co. also made a fine display of radio equipment in the Sportsman's Building. An indoor aerial was used, and a complete set shown.

Slade Manufacturing Company—Elimination of water lifting and wringing was demonstrated again and again by the "Klymax" washer, and the spectators seemed to be impressed. The gas-heating and varying stroke features also seemed to draw attention and the demonstrator was a busy man.

Solex Co.—Two large panorama pictures, portraying buildings whose windows were lighted from behind together with a list of prominent users of these lamps, formed the essentials of this display.

Square D. Switch Co.—Square D. safety switches were shown in great variety. The sides, walls and counter in front of the booth were covered with the different types, and the demonstrator stated that there were over 300 switches in display. Special attention was given to an exhibit of a safety switch-board, of their latest type, combining dead front and rear.

Stromberg-Carlson Telephone Co.—A switch-board and various types of telephone apparatus were exhibited in a well-arranged booth.

United Electric Co.—The Ohio Cleaner and the Coffield washer were nicely arranged and were demonstrated in an effective way. These appliances were shown in two booths, one in the Electrical Building, and the other under the grand stand.

Westinghouse Electric & Mfg. Co.—The Sportsmen's Building housed an attractive exhibit by the Westinghouse Company. A workmanlike radio set was exhibited and various parts of wireless equipment. Fans were arranged in various sizes, and a novel pedestal fixture held various types of lamps.

Wagner Electric & Mfg., Co.—A typical application of Wagner motors was shown in the Westco section, where they were attached to various types of pumps. The sturdiness of the motor was emphasized.

A. H. Winter-Joyner, Limited—An attractive line of recording and indicating instruments were displayed in this company's booth. The apparatus was displayed on a table, and on three vertical panels. Weston and Bristol instruments were shown, and in addition street lighting and bus-structure equipment. A demonstration was given with a phonograph and Bristol audiophone.

Illuminating Engineering Progress

Summary of a Number of Papers that Deal With Timely Subjects in Lighting Field

The members of the Illuminating Engineering Society meet in Convention at Swampscott, Mass., on Sept. 25-28. Some of the papers to be presented are of a most interesting character. The following advance information is of timely interest.

Influence of Daylight Illumination Intensity on Energy Used for Lighting Purposes in the District of Columbia

This is a paper by A. Smirnoff, of the Engineering Department, Potomac Electric Power Co. The large central station has always had a problem which has been difficult and expensive to solve. Throughout the day it experiences a certain normal, constant load. With the sudden darkening due to clouds or the approach of a shower, a heavy load is at once thrown on the system, causing an entirely unexpected peak. To take care of these emergencies, expensive storage batteries or additional generators are frequently maintained. The investment in this apparatus could be minimized if a means of predicting the action of the weather were available. Mr. Smirnoff has determined, as a result of investigations, that there is a light intensity which he calls the "psychological darkness" at which the customers begin to turn on the lamps at a surprisingly rapid rate. This is at approximately 1,500 foot-candles in the open air. He has kept a record of many different days, typically clear, typically cloudy, variable and the like, and by means of charts shows that as the intensity drops below this figure a sudden rise in energy consumption takes place. By use of automatic devices located at what might be termed strategic points in the surrounding country it is possible to record the change in intensity of light and thus warn the operator of the expected load. It is also possible to predict with a fair degree of accuracy the intensity which will prevail at a given place and a given day, hour by hour.

The Cost of Daylight

Messrs. M. Luckiesh and L. L. Holliday, Laboratory of Applied Science, National Lamp Works, Cleveland, Ohio, have a joint paper on this subject. At first thought we all believe daylight to be a free gift of Nature. It is, under certain conditions. The study of the economics of building construction, however, indicates that under many conditions it is not as we imagined—free. Windows are more expensive to build than the same amount of wall space; the heat radiating through a window is far greater than through the wall; these are both arguments why windows should be small. In congested areas and large buildings, the expense of erecting and maintaining light courts is considerable in addition to the overhead on the valuable ground acquired for these. Under many conditions, a given area could be lighted to an adequate intensity with artificial illumination continuously at a lower cost than that necessary to provide daylight. The authors, in the attempt to point out the economics of the situation, have considered a number of typical cases and have indicated the method of procedure when making determinations of this character. Building managers, architects and designing engineers should be interested in this paper.

Lighting of Public Eating Places Offers Great Opportunities

J. L. Stair, Chief Engineer, National X-Ray Reflector Co.

Practically no field of lighting offers as many opportunities for originality and special effects as the restaurant. Proper lighting is a big factor in the comfort with which one dines and should be given primary consideration by the management. A survey of the field indicates many types of eating places, varying from the commercial or industrial cafeteria to the elaborately decorative cafe such as found on the Great White Way. The demands for lighting are quite varied.

The author of this paper has skillfully handled the subject illustrating a large number of installations which have proven successful in service from the standpoint of comfort and originality. This paper can virtually be taken as a textbook on the class of lighting which it discusses and used as a guide by the designing engineer or solicitor on which to plan future installatons.

In the first group utility must be given primary consideration; neatness must be combined with efficiency. In the more decorative types, however, we find an extremely wide latitude of treatment.

Practical Applications of the Principles of School Lighting

The lighting of many of our school buildings is far below the standard prevailing in commercial and industrial establishments. This is indeed an unfortunate condition. The eye of the young child is in a formative state, and undue strain at such a period will surely react at a later date. Statistics indicate that a high percentage of absences and failures are due to defective eyesight. Conditions which tend to cause such effects should most certainly be remedied. The economics of the situation are apparent to any thinking individual. The city of Cleveland recognized that in many of the schools there existed marked opportunities for improvement, and employed a competent engineer, Prof. Dates, professor of Electrical Engineering, Case School Applied Science, Cleveland, to investigate the situation. After a survey of the field and study of conditions, he caused to be installed, under typical conditions many forms of suitable lighting units. These were tested under his direction as to efficiency and effectiveness. A study was made of such factors as are important in school lighting, including brightness, quality, glare, distribution and the like. As a result of this investigation, specifications were adopted for a standard unit and layout for the Cleveland schools. Professor Dates will outline his experiments and results at the convention.

In a paper to be presented at the annual convention of the Illuminating Engineering Society to be held at the New Ocean House, Swampscott, Mass., from September 25 to 28, Prof. Dates analyzes conditions as found, describes the methods of test, presents comparative figures on the different systems investigated, as well as the specifications finally arrived at. No one interested in school managament can afford to miss this paper and the discussion which will follow.

A Survey of Residence Lighting

Casual observation indicates that a large percentage of the homes throughout the country are inadequately illuminated, and further, that the average householder is unaware of the possibilities of modern lighting. Until recently, however, no exact data has been available indicating the extent of this inadequacy. Mr. Luckiesh, Director of Applied Science, Nela Research Laboratories, Cleveland, Ohio, who has devoted much thought to the question of residence lighting, sometime ago instituted a survey, results of which will be presented at the convention.. By means of a questionaire, he obtained data as the the actual installations in some fifteen hundred middle class homes throughout the country. Such features as the number of rooms, the type of lighting fixture in each room, the material which shades or envelops the light source, the number of sockets, the total wattage to be used, the number of portable lamps, brackets and convenience outlets, were tabulated and analyzed. The results of this survey are then compared with what the author terms "the conservative ideal average middle class home." The electrical industry, including the jobber and dealer, the fixture, wiring device and lamp manufacturers and central station representatives should be interested in the results of this analysis, which show that the average wired home to-day may be considered as only "half lighted." They will be interested in noting the character of equipment in service and the general tendencies as indicated by the findings.

Overcoming Daylight Reflections in Show Windows

The reflections in the plate glass of show windows created by a bright sky or by outside objects sunlighted to a much greater brightness than those within the display, often cause annoyance by very seriously interfering with the visibility of the display and correspondingly reducing the attractivness and effectiveness of the show window. It was found that the difficulty experienced with these reflections was overcome by lighting the objects in the display to intensities of the order of 1,000 to 2,000 foot-candles. A description is given in a paper by Ward Harrison and H. T. Spaulding, Engineering Dept. National Lamp Works, of a special lighting installation employing high power spotlights to concentrate artificial illumination on the important objects in the display. With a design of this character a practical installation showed that it was possible to obtain the necessary high intensities and do away with the objectionable reflections without an excessive wattage total. This paper should be of interest to the merchant who wishes to obtain the maximum return on his investment in show windows. It should prove of value to the central station solicitor in pointing out a way in which he can materially assist the merchant in one of his most serious problems.

Lighting Statistics of Representative Urban and Suburban Homes

The lighting industry is particularly fortunate in being able to obtain the data presented in a paper by Mr. Norman Macdonald. For some time the associated Edison companies have been conducting a survey, as indicated by the title. The object of this was to improve service conditions in the residential field. With the resources of these large companies to draw upon, a most comprehensive survey was possible. A field force of many individuals actually visited typical homes and obtained information regarding the various elements of their lighting system. The summation of this data is presented. Factors which should serve as guides in merchandising equipment or supplying service are now definitely known which heretofore were only roughly estimated. Among these are, the average number of sockets installed, the percentage of these actually in service, the percentage deemed superfluous, the percentage out of commission, the percentage in inaccessible positions, etc., the number of baseboard or convenience outlets in the average home, the type of lighting fixtures employed in the various rooms, the frequency of cleaning, the average wattage per lamp and the like. So many factors are presented that it is impossible to attempt to enumerate all of these in a brief synopsis. One should read the paper to gather the full import of these data.

Lincoln-Sangamo Demand Energy Meter

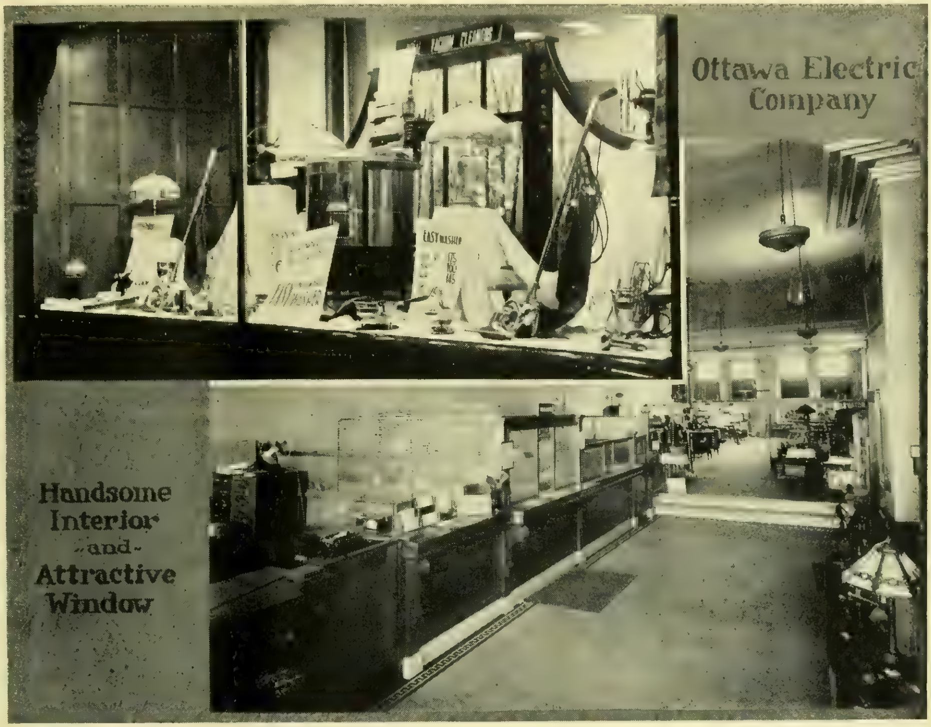
The Lincoln Meter Co., Ltd., and the Sangamo Electric Co. of Canada, Ltd., announce an arrangement whereby their two instruments can be purchased in the form of a single meter. The combined meter is to be known as the "Lincoln-Sangamo Demand Energy Meter." It will be distributed by the Sangamo Electric Co., Ltd., Toronto, and The Lincoln Meter Co., Ltd., Toronto. The arrangement will interest both the supplier and consumer of electric current. Students of rate making agree that the measurement of both actual consumption and demand is the only fair means of billing a current consumer. That is, the measurement of either quantity, alone, is insufficient. How a customer uses his current as well as how much is vital. Both quantities are accurately measured by the Lincoln-Sangamo Unit. Every customer is billed on a basis fair to all parties concerned. Power-factor is taken into consideration, as the Lincoln meter measures demand on either a watt or volt-ampere basis. A small switch contained within the instrument makes this available over a wide range of power-factor. No one is penalized in case another user on the same line uses current incorrectly. The central stations fixed charges are fairly distributed.

The single mounting of the two instruments facilitates installation and effects economies not possible with the individual meters. It is specifically stated that there is no mutual ownership or consolidation of the two concerns. The new selling arrangement will not affect the individual selling of either instrument for separate installations.

Jewell Measuring Instruments

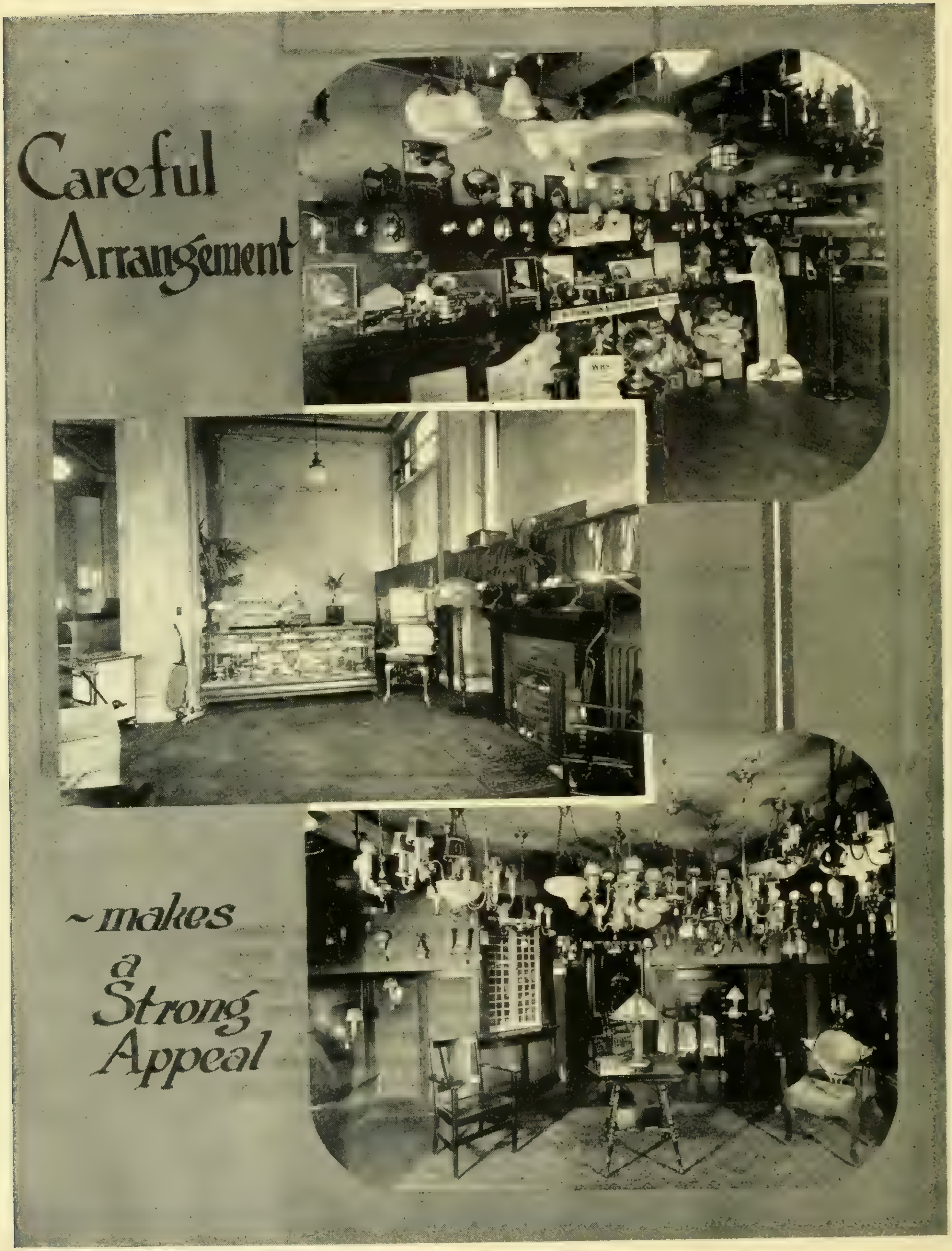
The Jewell Electrical Instrument Company, of Chicago, have recently added to their line of electrical measuring instruments and issued an entirely new catalog. Each instrument is clearly illustrated and its applications, size, scale length, accuracy and general characteristics described in detail. In the back of the catalog detailed dimensional drawings are shown of each instrument together with full size scales and complete listing of readings and prices. Probably the most important addition to the Jewell line has been their new miniature movements for a.c. and d.c. instruments, both switchboard and portable. Their new polyphase watt-meter development also deserves creditable comment. In the radio field, in addition to their widely known and recognized line of uniform size instruments they have developed several special instruments, such as their Triplex filament meters, wavemeters, and A-B battery testers. The company have also been adding new representatives. In addition to Filer-Smith Machinery Company at Winnipeg, the Jewell line will be sold by Henry Engineering Company at Toronto.

Better Merchandising



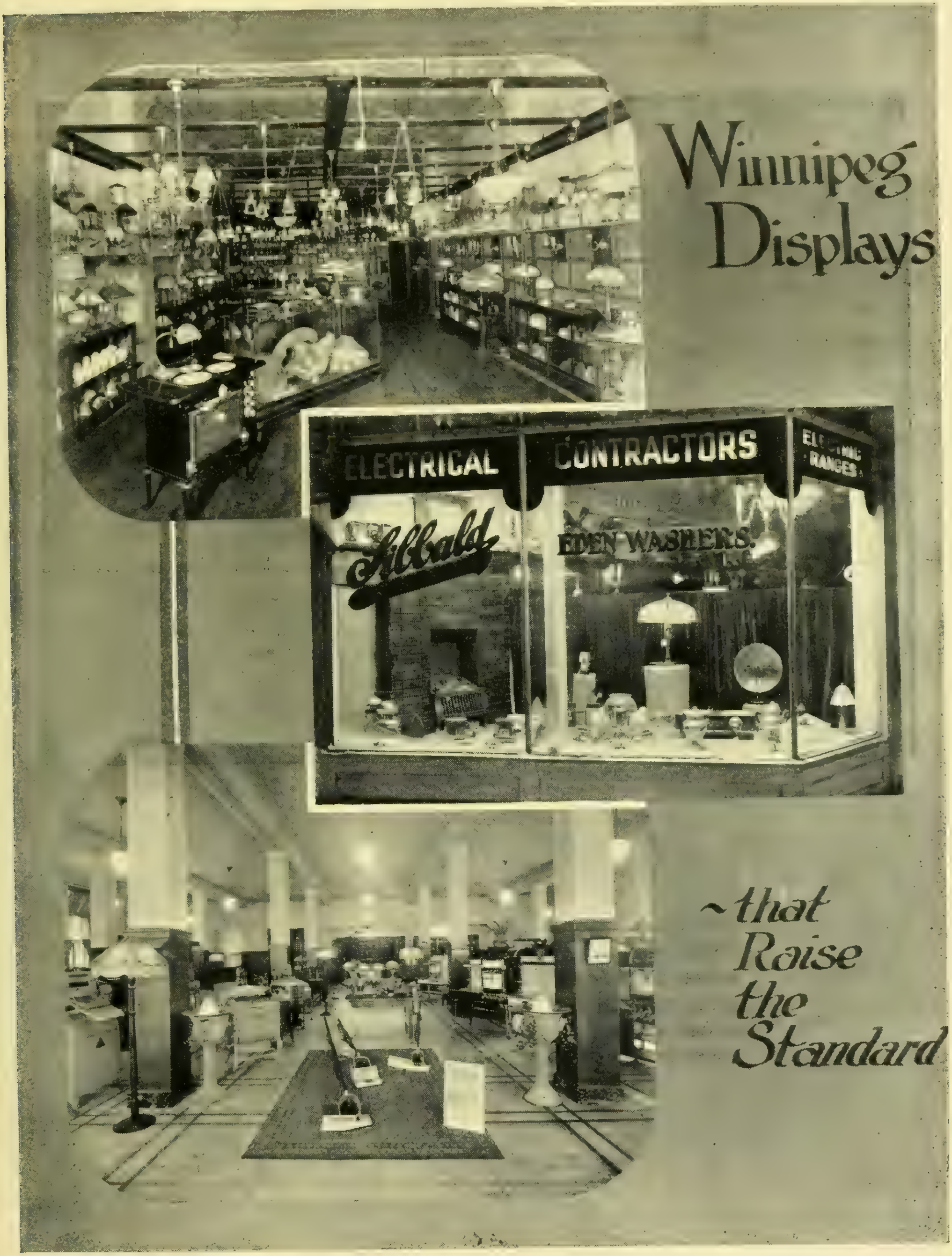
The attractive Offices and Showrooms of the Ottawa Electric Company are shown in one of the views above. The other (upper) view reproduces a typical window display. This company makes a strong bid for the appliance business of its customers. Both windows and showrooms are scrupulously clean and the equipment is artistically displayed and courteously demonstrated.

Better Merchandising in the Prairie Provinces



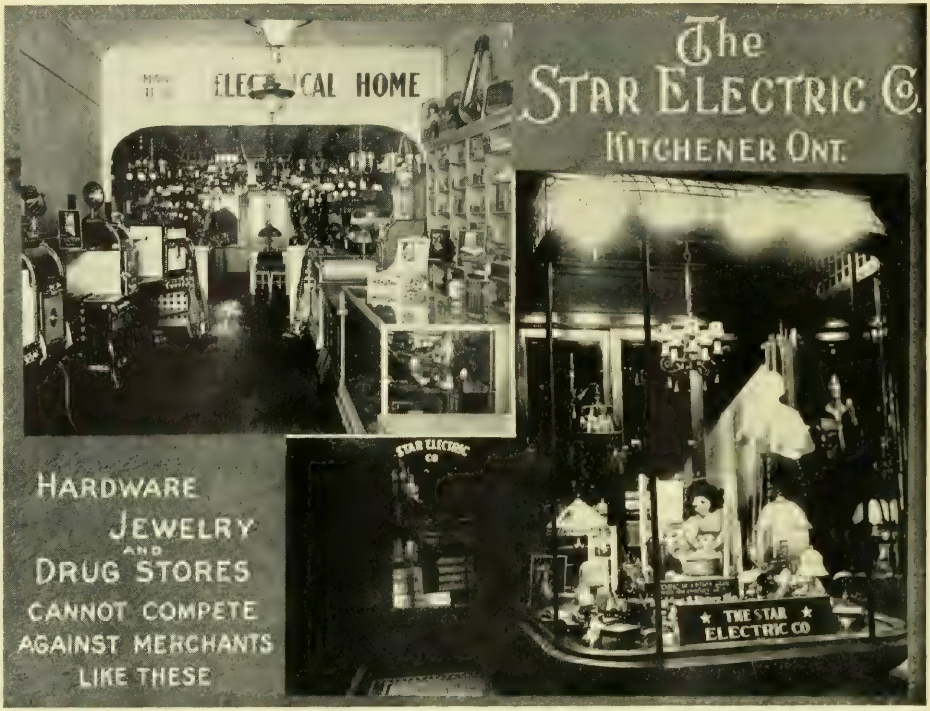
Merchandising in Winnipeg—Upper, Lighting Electric Service; Middle, Winnipeg Electric Railway Co.; Lower, McDonald & Willson Lighting Co.

Showing Some of the Finest Stores on the Continent



Merchandising in Winnipeg—Upper, Winnipeg Engineering Co.; Middle, Sibbald Electric Co.; Lower, Winnipeg Hydro-electric System

Minding Our Own Business



Where stores such as that illustrated above are established, there is no danger of the electrical business being stolen by other trades. Kitchener citizens "buy electric goods in electric stores" because these stores are more attractive and give service.

BETTER MERCHANDISING

Was Rip Van Winkle an Electrical Man?

"We bought this house six years ago and have never had a call—either personal or telephone—from an electrical contractor or an electrical merchant during all that time. Even after the 'Electric Home' campaigns when we naturally expected the electrical industry would make some special effort—and when we were certainly most favourably inclined to make some changes and additions—not a single ring of the door bell. I cannot understand you electrical people. Are you sure you understand your business?"

What do **you** think of this arraignment of the electrical industry by a wide awake Toronto housewife?

Does it apply only to Toronto or is it also true of **your** town?

Answer the question as best you can—are you sure you understand your business?

The above statement shows that the public are watching us. The average housewife knows that the proper place to sell electrical wiring is in the house—where the wiring goes; the same with appliances. When she fails to get the attention she expects, she criticizes—"you don't know your business."

ARE YOU SURE YOU UNDERSTAND YOUR BUSINESS?

Co-operation in Electrical Industry of British Columbia

"Fieldman" a Feature of the System—Propaganda Against Cheap Installations—Preparing for Electrical Home Exhibit

By REY E. CHATFIELD[*]

Co-operation in the Electrical Industry in British Columbia has been given a thorough tryout for a year, ending August, 1922. Certain very definite results have been obtained, after many obstacles were overcome through the untiring efforts of the leaders in the industry. The Electrical Service League of British Columbia was formed in the summer of 1920 under the name of the British Columbia Electrical Co-operative Association, which name was later changed to the present one. In July, 1921, a fieldman was engaged and active intensive work started. The first work of the fieldman was the reorganization of the contractor-dealers' association. Several months of effort was necessary to accomplish this; however, the association was finally put on a firm basis. This was followed by a co-operative advertising campaign for the Christmas trade, promoting the sale of appliances, which lasted six weeks, and was a pronounced success.

The activities of the League and the fieldman may be best presented by a summary of the work done since the first of the year, beginning January 1st, 1922. In order that co-operative efforts in the industry may be successful two things are necessary; active participation in co-operative work by the members of the industry and actual field work by the fieldman. Sixty-seven per cent of the time of the fieldman has been spent in the field during the last seven months. The fieldman paid 302 calls upon contractor-dealers, 71 on wholesale representatives and 99 on representatives of the central station, manufacturers representatives, architects and others interested in co-operative work. During the same time 86 contractor-dealers called at the office of the fieldman, 23 representatives of wholesale firms and 114 central station representatives and others. The Advisory Council held 23 meetings during this same time and the contractor-dealers' association held 14 meetings, which were attended by the fieldman.

For ease in discussion, I propose to divide the work into four subdivisions:—

1. Organization,
2. Educational work within the industry,
3. Publicity,
4. Underwriters and Inspection Departments.

The work of organization of the contractor-dealers of established standing in the community was accomplished by reviving interest in the local branch of the National Association of Electrical Contractors and Dealers and was in no way unique. Organization of the small non-association contractors sometimes called the "curbstone contractor" was an unusual and difficult undertaking. These men who for the most part are ex-union men, or men who still carry a union card and do contracting when not working as journeymen, had a great distrust of the Service League and a still greater suspicion of the employing contractors, because of past experience of labor disputes, etc. This, together with the requirement that a National Association member must have a definite place of business, prevented such men joining the National could they have been persuaded to do so. If the effort to organize and educate this class of contractor was to succeed a separate organization had to be started.

Starting with a group of three men attendance at preliminary meetings finally reached thirty or more, and with this as a basis the B. C. Electrical Contractors Association was formed. This group share the meeting place with the National Association members, holding their meetings on alternate Tuesday evenings. Membership in neither of the two contractor organizations is 100 per cent; however, each organization has a representative group.

Central station representatives, manufacturers and jobbers meet weekly with the Advisory Council so that a loose organization of the industry has been accomplished. With a loose organization of the industry effective education of members of the industry could be started. Fully eighty per cent. of the failures in the contractor-dealer business have been brought about by an ignorance of fundamental business principles. With a view to teaching such fundamentals, bulletins were issued fortnightly and then monthly, from the office of the secretary-manager, dealing with such subjects as "Overhead," Method of Determining Overhead, Application of Overhead Percentage, Merchandise Turnover, Turnover on Accounts and kindred subjects. Following the publication of these bulletins blackboard lectures by the fieldman at contractor-dealer meetings of both the National Association members and independent contractors, brought the points home to the individual contractor.

Come to the Convention, Nov. 13 and 14.

Thus the fieldman was enabled to go to the store or office of the contractor-dealer or contractor and apply the principles to the particular business of the individual. With this as an entering wedge the fieldman has been called in the last seven months to revise, reorganize or install new systems in accounting, including cost systems, for twenty contractors in Vancouver and New Westminster. Each system has been developed to fit the particular business of the individual, and the type of accounting varies from one installed for a small contractor based on three algebraic equations and having columns labelled "plus" and minus," to the system installed for one of the largest contractors who employs an expert bookkeeper and has his accounts audited by a chartered accountant.

The installation or revision of the accounting system of an individual contractor enabled the fieldman to stress the value of discounting bills with the wholesaler; of prompt collection of accounts and of keeping accurate job costs. Particular attention was given when necessary to the quantity purchase on the part of the contractor when small purchases would be more profitable. The false lure of the extra five per cent for a quantity purchase has resulted in overstocking by many contractors. This work was so effective that salesmen from one jobber reported that they could follow the steps of the fieldman by the quantities ordered by the various contractors. This might seem a hardship at first to the wholesale house but small accounts promptly paid are more desirable than larger accounts of dubious worth.

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[*] Secretary Manager B. C. Electrical Co-operative Association.

During the same period the fieldman has been able to assist in the re-arrangement of four contractor-dealer stores. One store had been completely changed from the show windows to the shop. The same firm had the fieldman install a complete accounting system, which has been in successful operation since January fifteenth. Weekly change of window display has also been adopted by several contractor-dealers who heretofore had not used their show windows advantageously.

With the small residence wireman the educational work has not progressed so far, although a number of lectures on the "Cost of Doing Business" have been given, as well as several lectures on estimating, given by one of the National Association members. To date however, progress has been slow, but the fieldman has installed one accounting system complete and one job cost system for these contractors; and within the next thirty days will complete the installation of six more systems.

An effort has been made to improve the salesmanship of the contractor-dealer and to stress the sale of standard materials and quality workmanship as against cut prices.

Lectures to contractor meetings, individual instruction, as well as group instruction in salesmanship, have been given by the fieldman and by the more successful contractors.

Convention of Contractors and Dealers in Toronto, November 13 and 14

Early in the Spring the radio craze hit Vancouver and found the contractor-dealer utterly unprepared to handle this class of equipment. Under the auspices of the Electrical Service League sixteen lectures on the principles underlying speech transmission and reception were held. Speakers were furnished by the manufacturers of radio telephony apparatus and great stress was laid on the technical information necessary to successfully merchandise this apparatus. These meetings were held twice a week and at the conclusion of the series of lectures the dealers frequently met in the League office to settle, co-operatively, little problems arising in the merchandising of radio equipment.

The next phase of the work of the League since the first of the year is publicity. Early in March at the Vancouver Building Exhibition the central station, manufacturers, jobbers and contractor-dealers maintained a co-operative Electric Home demonstration. Three rooms of an Electric Home were built and furnished completely, and equipped with appliances. The appliances were chosen by lot and all name plates covered. Volunteer demonstrators were furnished by the industry at large. No Vancouver electrical firm maintained a separate exhibit, but all united to make the League exhibit a success.

Some 10,000 copies of a pamphlet were distributed telling the story of a proper wiring installation. So successful was this exhibit that even today prospective builders call at the League office for information regarding illumination and wiring. Plans have been drawn for an industrial lighting exhibit to be built this fall. In this venture the League has the hearty support of the Provincial Workman's Compensation Board.

During June a short co-operative advertising campaign for the promotion of the sale of appliances as wedding gifts was carried on, however, this campaign did not bring the desired results as it was not properly backed up by newspaper advertising.

To combat the cut price wiring installation the League issues a pamphlet "The Cost of the Lowest Bid," which is mailed to every person taking out a building permit.

At the same time the fieldman supplies a column a week of propaganda against cheap wiring installations to the Journal of Commerce. This paper is the trade paper for the entire building trade and a copy of the issue containing this propaganda is also mailed from the Journal office to every person taking out a building permit. This hits the builder from two angles, both decrying the practice of installing cheap, inadequate electric wiring. These articles and the Bulletins issued from the League office have been rather widely copied by journals in Canada and in the United States. The fieldman for the League has also furnished the Pacific Coast Lumberman an article a month on Industrial Illumination, Electricity in the Logging Industry, Electricity in the Mills, etc.

All of this newspaper and magazine space has cost the League nothing and has spread the message of "Do It Electrically" throughout the Profince.

Altogether the League has received 375 inches of publicity as reading matter, which valued at the ordinary advertising rates would have cost the League approximately $1,000 —in addition to $500. worth of advertising space that has been purchased.

As a final effort the League will exhibit Vancouver's first Electric Home during the latter part of September. Funds for the publicity of this have been raised through the co-operation of Messrs. Rush and Read, owners; the building trades of the city; and the Electrical Service League. Something in excess of $2,000 has been raised for the publicity fund, of which amount $500. has been contributed directly by the Electrical Service League. The Home is situated in Shaughnessy Heights district, Vancouver's fashionable residence district and is a model home throughout. The League feels the Electric Home will do much to educate the public to the need of adequate wiring by qualified contractors for the modern home.

This resume of League work has been compiled that other cities contemplating the organization of co-operative work in the electrical industry may have some idea of the scope of this work and the methods used by one district in solving some of the problems which are common to the industry all over the continent.

Correction

An item in our September 1st. issue, under the heading "Ferguson. Pailin Ltd., Enter Canadian Field" contained a slight error, two words being omitted. The fourth line, third paragraph, should have read "formerly chief switchboard and switching equipment draftsman, and later designs engineer etc."

Fuel Saving Possibilities

Report No. 10 on "Fuel Saving Possibilities in House Heating," written by L. M. Arkley, M. Sc., M.E.I.C., and James Govan, M.R.A.I.C. and published by the authority of the Honorary Advisory Council for Scientific and Industrial Research, Ottawa, was written for the purpose of bringing to the attention of house owners and builders, data which would enable them to build more scientifically, and at the same time economize on fuel consumption.

The joint authors have brought out a number of points that previously have received very little attention; furnaces, chimney and wall construction and the ventilation of buildings are dealt with and many facts explained that are little known to the average house builder.

Coast News is—Co-operation and Optimism

C. C. Carter of Vancouver will shortly commence work on the $20,000. wiring installation for the new government hospital at Essondale, B. C.

* * *

Hawkins & Hayward of Victoria, B. C. have just been awarded a $33,000 contract for the wiring of the new Royal Jubilee Hospital, Victoria, B. C.

* * *

The Firm of Smith, Robinson & Co. Ltd. of Vancouver have just been awarded the contract for the installation of the electrical equipment in an addition to the Government Grain Elevator at Vancouver, B. C.

* * *

All railroad trackage on Industrial Island, a government owned industrial centre in False Creek, Vancouver, has been electrified. The work of installing the poles and trolley lines has been completed by W. W. Fraser of Vancouver. All switching and hauling will be done under contract by the B. C. Electric Railway Co. Ltd.

* * *

R. N. Dicer has been awarded the contract for wiring and apparatus installation for the new bakery being erected by Shelly Bros., Vancouver. It is reported that the contract was let for a figure around $70,000. The bakery is to be a four-storey reinforced concrete building, completely equipped electrically. All baking machinery will have individual power units regulated by dual control—separate control at each machine and remote control through switches in the engine room.

* * *

The Harbor Board of Vancouver has just called for tenders for the supply and installation of the most complete electric equipment and cargo lifting plant for their new $2,000,000 Ballantyne Pier. The equipment specified by Mr. A. D. Swan, harbor engineer of Montreal, consulting engineer for the Harbor Board, includes semi-portable electric cranes, electric freight elevators, electric escalators or inclined conveyors, electric capstans, tractors and trailers .

This very complete electrically operated equipment together with an elaborate lighting system will allow cargo to be handled from ship to dock, or from dock to ship, at any hour of the day or night and will give Vancouver the best equipped dock on the North Pacific Coast.

It is roughly estimated that this equipment will cost in the neighborhood of $250,000. Bids on this equipment will be received up till noon of Monday October 2nd, 1922.

Co-operation to the Fore

Co-operation in the electrical industry in British Columbia has taken on an added impetus since the visit of Laurence W. Davis, representative of the National Association of Electrical Contractors and Dealers, and Kenneth A. McIntyre, Canadian representative of the Society for Electrical Development, Inc. of New York. Arriving in Vancouver Monday morning, August 14th, these two gentlemen were the guests of the Advisory Council of the Electrical Service League of British Columbia, at which time the Council benefitted by their experience, particularly in solving the problems attendant upon an Electric Home exhibit. Monday evening they addressed representatives of all branches of the industry at a dinner given under the auspices of the Electrical Service League of British Columbia. Mr. McIntyre spoke on "The Value of an Electric Home to the Electrical Industry" and Mr. Davis on "Co-operative Associations in the Electrical Industry." Tuesday evening Mr. Davis addressed a joint meeting of the members of the National Association of Electrical Contractors and Dealers and members of the small non-association electrical contractor's club.

The direct result of these meetings in Vancouver has been to increase membership in the National Association of Electrical Contractors and Dealers and to gain the more united support of the contractors for the Electrical Service League of British Columbia.

Victoria Interested, Too

Wednesday Mr. McIntyre and Mr. Davis, with Mr. Sid Smith, assistant district manager of the Canadian General Electric Co., W. W. Fraser, past president of the local branch of the National Association of Electrical Contractors and Dealers and Rey E. Chatfield, secretary-manager of the Electrical Service League of British Columbia, went to Victoria and addressed the members of the Electrical Association of Victoria, B. C. at a dinner held in the Dominion Hotel. Previous to this visit to Victoria, the contractors of that city could not be interested in association work. At the conclusion of the dinner every contractor present became a member of the National Association. A one hundred per cent meeting of the industry in Victoria, the contractors of the city joined the Association to a man. In addition the central station took out an association membership in the National association.

Many from Out-of-town

Through the kindness of Mr. S. J. Halls we also have the following report on the Victoria Meeting:

The annual dinner of the Victoria (B.C.) Electrical Association was held at the Dominion Hotel, Wednesday, August 16th., when some thirty (30) members sat down and enjoyed an excellent repast. Two visiting electrical men, Mr. L. W. Davis, special representative of the National Association of Electrical Contractors and Dealers, of New York, and Mr. Kenneth A. McIntyre, Canadian representative of the Society for Electrical Development, made particularly interesting speeches during the course of the evening. Among the out of town friends at the gathering were noticed Mr. W. W. Fraser, Mr. Sid Smith, Mr. R. E. Chatfield of Vancouver, and Mr. John Muir, electrical inspector for Saanich.

The officers of the organization are Mr. A. T. Goward, hon. president; S. J. Halls, president; R. T. Murphy, vice-president, and H. E. Miller, secretary-treasurer.

Electrical Contractors' Ass'n. of B. C.

After months of effort on the part of the fieldman of the Electrical Service League the small residence wiremen of Vancouver have organized the Electrical Contractors Association of B. C. This organization is entirely independent of any existing electrical contractor association but is formed for the specific purpose of bettering conditions among the residence wiremen. The following officers were elected August 1st, to serve for a period of six months:—president, A. M. Buck; secretary-treasurer, Jos. Holt; executive committee:—H. B. Steeves, Mr. Johnson of Johnson Electric, and Mr. Safford of Crosby and Safford. Meetings are held in the rooms of the National Association on Tuesday evenings two times a month.

Contractor-Dealers Organize in Regina

In our last issue we made brief mention of the recent organization meeting of the contractors and dealers in Regina. The following report from Mr. H. Naismith, secretary of the new association, covers the ground more fully. It is especially satisfactory to notice that eleven applications, with cheques attached, were handed in the same evening:

"The electrical contractor-dealers and central station men of Regina, Moose Jaw, Saskatoon, Indian Head and Grenfell took advantage of the visit to Regina, Sask., on August 3rd and 4th, of Mr. Lawrence W. Davis, special representative of the National Association of Electrical Contractor-Dealers, and Mr. Kenneth A. McIntyre, Canadian representative of the Society for Electrical Development, to hold a "Get Together" dinner in the Regina Trading Company's banquet hall. Mr. J. R. Young, of the Sun Electric Ltd., Regina, presided at the meeting. Music was furnished by the Capitol Theatre orchestra. Community singing was led by Mr. C. M. Anderson (Artie Fatbuckle) of the Northern Electric Co. Ltd.

Mr. J. R. Young

"Mr. Davis spoke at length on the contractor-dealer's problems. His address was well received, as he handled the question in a very able manner. Mr. McIntyre outlined the aims of the Ontario Association, the Hamilton and Toronto "Electrical Home" campaigns, and the work of the society for electrical development. Eleven applications with cheques attached were handed in that evening. A vote of thanks and appreciation was extended to Mr. J. A. Daly, manager of the Northern Electric Co. Ltd., and Mr. E. C. Brown, local representative of the Canadian General Electric Company, for their labors in connection with the "Get Together" dinner, and the successful way in which they brought together, on such short notice, contractor-dealers within a radius of two hundred miles.

"Friday morning a party including Messrs. Davis and McIntyre took in the sights of the Saskatchewan Provincial Exhibition. Both gentlemen enjoyed themselves thoroughly and expressed surprise at the greatness of Regina's annual exhibition—in fact if I remember correctly Ken McIntyre remarked that Toronto National Exhibition resembled our exhibition very much."

Beatty Bros., Fergus, Ont.; have acquired the British Empire rights for the manufacture of the 1900 washer. The washer will be manufactured at Fergus, Ontario, and distributed by the branches of Beatty Bros. These distributing centres are located in London, Eng., London, Ont., St. John, Montreal, Toronto, Winnipeg, Edmonton and Vancouver. 75 salesmen are employed by this company.

New Diesel for Vernon, B.C.

A 200 horsepower diesel engine extension to the city power plant of Vernon, B. C., is now completed and giving very satisfactory results. The engine was built by Messrs. Mirrlees, Bickerton & Day Ltd., Stockport, England, and is direct connected through a flexible coupling to a 175 kv.a. 2,300 volt, 60 cycle, 3 phase generator, with direct coupled exciter supplied by the Canadian General Electric Co., Vancouver, B. C. The total capacity of the Vernon plant is now 925 horsepower and makes for a very fexible installation. The extension was under the direct supervision of and was engineered by the City Superintendent, Mr. S. H. Excell.

Enderby Installing Electric Plant

The City of Enderby has let the contract for a municipal lighting plant which will consist of an 85 horsepower semi-diesel oil engine and belt driven generator, 75 kv.a. 2,300 volts, 3 phase, 60 cycle, being supplied respectively by the Canadian Allis-Chalmers Co., and the Canadian General Electric Co. The latter company is supplying the switchboard, lightning arresters and other accessories. This plant is being engineered by S. H. Excell, city superintendent of Vernon, B. C., and generally supervised by him till completion.

Good Reason for Optimism

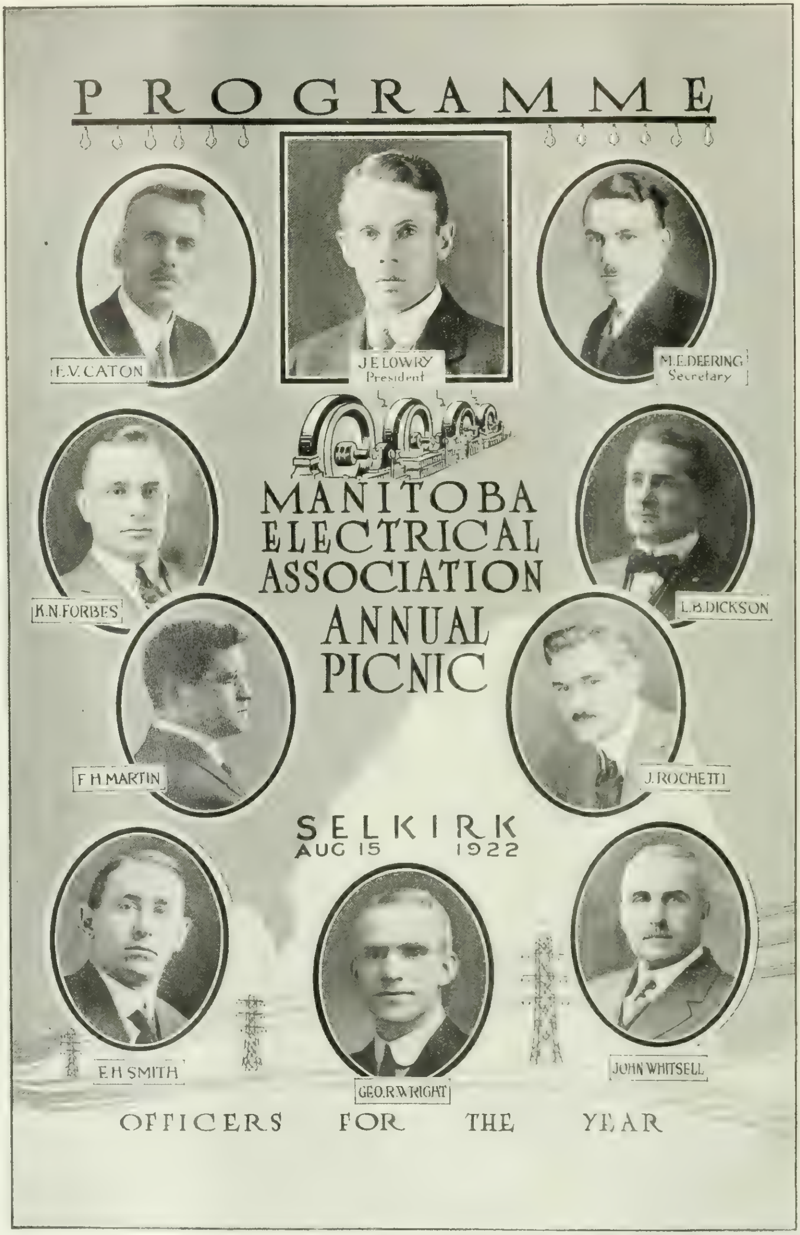
As an indication of the way business is coming back, Mr. B. S. Barnard, general sales manager and vice-president of the International Clay Products Company, New York, reports that recent orders include over a million feet of conduit from the Bell Telephone Company, and upwards of 400,000 feet for the Hydro-electric Power Commission of Toronto. The International Clay Products Company succeeded the Clermont Sewer Pipe Company, and it is the Clermont conduit, manufactured from pure fire clay, that is being supplied on the above orders. Mr. Barnard reports that he has booked orders sufficient to keep the Clermont plant on a 100% operating basis for the next six months, fine orders having been received also from the Western electric Company, Inc.. the Niagara Falls Power Company, the Northern Electric Company, and others.

"Hydro" Issues Supplementary Notice

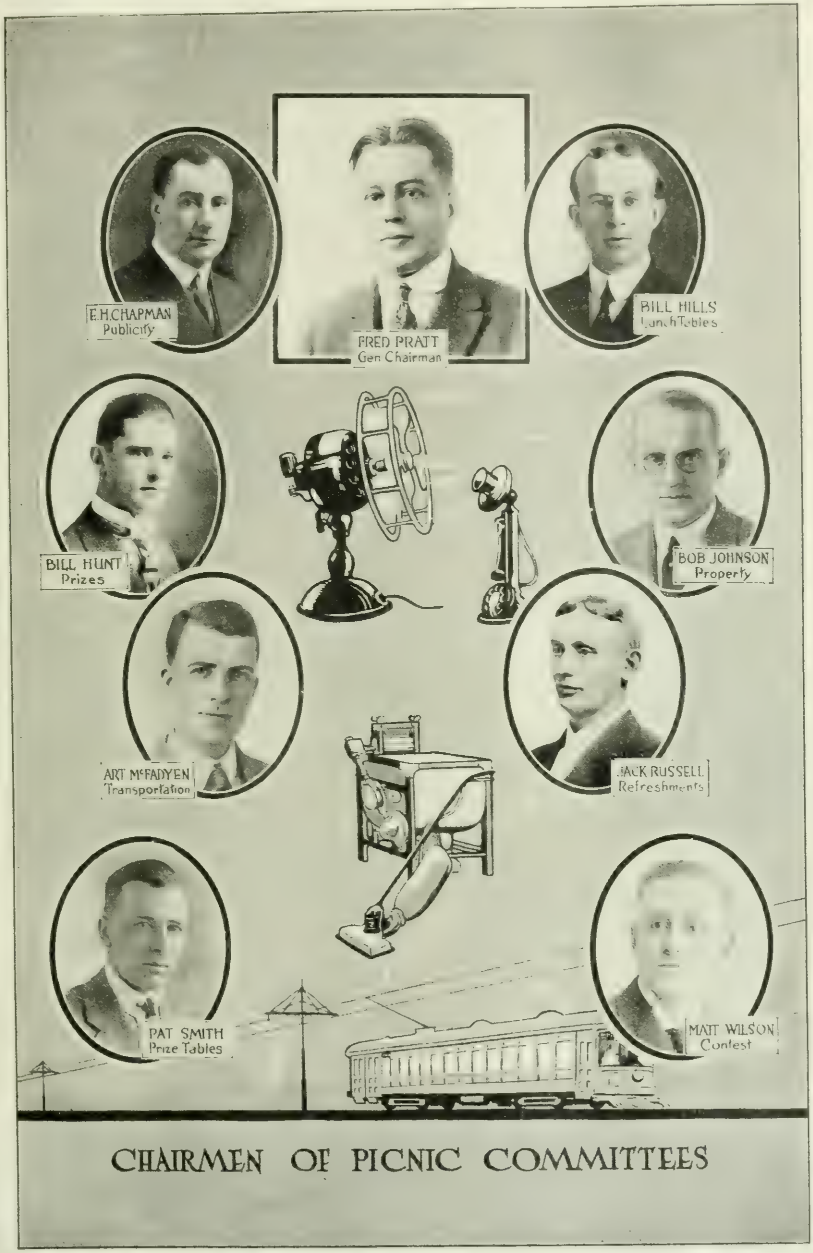
Gentlemen:—As some of the jobbers and contractors still have small quantities of the 5½ old code split knobs in stock, which they were unable to dispose of (within the time limit) September 1, 1922, we have deemed it advisable to advance this date from September 1 to November 1, 1922. After that date, only approved new code knobs, that are built to conform with the specifications for porcelain insulating devices, as issued by the Approval Laboratory, under date of May 7, 1921, will be accepted.

We also take this opportunity of advising that switch and receptacle plates of substandard thicknesses (.025 and .032 inches) will not be accepted after November 1, 1922. Approved switch and receptacle plates of at least 0.040 inches in thickness will be required.

Kindly arrange to dispose of your present stocks of substandard knobs. switch and receptacle plates by the foregoing date, as we feel that ample notice has already been given the Trade regarding these matters, and would refer you to Approval Laboratory Bulletin No. 18, May 7th, 1921. (revised March 1st, 1922,) and Bulletin No. 10 of June 11th, 1920, October 29th, 1920 and August 26th, 1921, copies of which may be had by application to Mr. W. P. Dobson, Laboratory Engineer, 8 Strachan Avenue, Toronto.



Cover of twenty-eight page programme of Manitoba Electrical Association—The Association should flourish under the guidance of such officers as are pictured above



The back cover of the programme—Judging from results, the Committee pictured above, which arranged the Selkirk Picnic of the Manitoba Electrical Association, was carefully "Hand picked"

Manitoba Electrical Association in Gay Mood

Annual Picnic Consisted in Entertaining the Orphans of the City — Radio Broadcasting and Games of Fortune—All Members Worked Like Trojans

On Tuesday the 15th August, over 300 orphans from the various children's homes spent a most enjoyable time as guests of the Manitoba Electrical Association at Selkirk Park. The Winnipeg Electric Railway Co., had sufficient cars on hand to carry the crowds from Winnipeg to Selkirk. On arrival at the park about 11, a.m. every one was ready to indulge in the splendid programme of sports that had been arranged and during the morning most of the children's events were run off, the afternoon being devoted to the races for the grown ups, as well as baseball games for both young and old. The prizes were donated by the various electrical firms, for the adults, and prizes for the children were bought by the Association.

One of the great attractions of the day was a radio broadcasting concert of the Manitoba Free Press; for this a Northern Electric tube set with two stages of amplifiers, with a Western Electric loud speaker. was used, and every word in the news service and every note in the music was distinctly heard. Another strong attraction was a wheel of fortune, which was in charge of Art. McFayden, and Bill Hunt, A considerable amount of money was raised in this way, in fact Art. had to close up shop, as he ran out of dolls, boxes of chocolates, etc.

The Chairmen of the Picnic Committees were as follows, Fred Pratt, general chairman; Bill Hills, lunch tables; Art McFayden, transportation; Pat Smith, prize tables; Bob Johnson, property; Jack Russell, refreshments; Bill Hunt, prizes; Matt Wilson. contest; and E. H. Chapman, publicity. Great credit is due Fred Pratt, who worked like a "Trojan" for weeks before the picnic.

Among the various ways that the Association found to raise funds to help defray the expenses of the day's outing, was that of publishing a picnic programme, which contained twenty eight pages, and contained electrical advertising only. A nice profit was shown from this source. The front cover contained photographs of the executive, and the back cover photographs of the chairman of the picnic committees, reproductions of both being shown herewith. At the conclusion of the supper, every orphan was presented with a present well worth having, also the attendants of the Homes, and each Home received an electric heating pad.

Messrs. Cochrane Stephenson & Co. Ltd., have opened an office at 608 Pacific Building, Hastings Street, Vancouver. This office which will be managed by Mr. Harry C. Stephenson, will take care of the B. C. and Alberta territory.

Inauguration of Civic Gazette

The scheme put forward by J. G. Glassco, manager of the Winnipeg Hydro, for the inauguration of a Civic Publicity Bureau in the City of Winnipeg has been adopted by Council. In addition to other forms of publicity work it is proposed to publish a Civic Gazette which will appear as a miniature newspaper of about three columns, printed in the regular daily papers with a special heading. Facts and figures regarding civic life in general will be published from time to time in connection with all the different phases of civic operations. Special attention, however, will be given to the Winnipeg Hydro-electric System, as it is recognized that the citizens should be brought into closest possible touch with this important municipal utility.

Mr. Glassco in making his recommendation to Council stated "We want the citizens of Winnipeg to take a sympathetic and intelligent interest in the affairs of their various utilities and the dissemination of information concerning these utilities is the proper means of maintaining this interest. My efforts will be directed in making the Civic Gazette a budget of snappy, interesting news items which all citizens as well as tax-payers should find easy to digest."

Mr. C. F. Gray Returns to Winnipeg

Mr. Charles F. Gray, consulting electrical engineer, and former Mayor, of Winnipeg, has just returned to that city after a year's absence in England. Mr. Gray is again taking up his professional work having made connections with British Capital that will mean business in the future. While in England Mr. Gray had the distinction of being elected a Fellow of the Royal Geographical Society.

New From Edmonton

The Carey Electric, electrical engineers and contractors, Edmonton, Alta., have recently been awarded the wiring and lighting fixture contract for the new wing of the Misericordia Hospital, Edmonton; building costing $250,000. Also contract for wiring and lighting fixtures for the Kitchen Building 101st Street, Edmonton, Alta;

Mr. G. Coward, 93rd. Street, Edmonton, Alta., has recently gone into business as an electrical contractor. Mr. Coward was formerly employed for 2½ years with Messrs. B. L. Perry, Ltd., electrical engineers and contractors, having altogether had about 15 years' experience in the electrical trade. Mr. Coward, has seen considerable service overseas, having served with the 63rd and 8th Battalions, enlisting in 1915 and being discharged in 1918.

The Annual Picnic of the Manitoba Electrical Association—

Succeeds Mr. Caton

Born at Bristol, England, in 1886, Mr. J. W. Sanger received his technical education at Faraday House Electrical Training Institution, London, England, from 1903 to 1907. On leaving Faraday House he accepted a position with the Midland Electric Power Company, Staffordshire, England, as district superintendent in charge of sub-stations and all distribution for several towns in a manufacturing centre. He remained with the company until he resigned in 1911 to come to Canada where he joined the engineering staff of the Winnipeg Hydro-electric System, the same year being appointed superintendent of distribution for the system. Toward the end of 1913 Mr. Sanger accepted the position of assistant to the manager of the Winnipeg office of the Siemens Company of Canada Ltd., remaining with this firm until July 1915 when he was made power house superintendent for the City of Winnipeg at the Point du Bois power house, which position he held to the present time. He has just succeeded Mr. E. V. Caton as chief engineer of the Winnipeg Hydro-electric System.

Mr. J. W. Sanger

Represents Hatheway & Knott

Fred E. Garrett, 501, Confederation Life Block, Winnipeg, has been appointed Western Representative for Messrs. Hatheway and Knott, New York, who are Canadian Sales Agents for the following: Killark Electric Co. Manhattan Electric Supply Co.; Steel City Electric Co.; McGill Mfg. Co. (Lamp guards), Heinmann Electric Co. (Radio Supplies). Eugene T. Turney Laboratories. (Radio Apparatus). Mr. Garrett has also been appointed direct representative for Western Canada for the Oshkosh Mfg. Co., pole line construction tools.

A. L. Fisher, Canadian Representative

A. L. Fisher, late sales manager of Stephenson, Russell Ltd., Winnipeg, has opened an office at 290 McDermot Ave., Winnipeg, where he will specialize in radio supplies. Mr. Fisher has just been appointed Canadian representative for the General Radio Company, who are affiliated with Cox-Cavendish Electrical Co. Ltd., of London. Harlesden, Edinburgh,, and Bradford, England.

Appointed Operating Superintendent

Born at Walkerton, Ont., in 1885, Mr. C. A. Clendening received his education at the public and high schools of Walkerton, and his technical training at the Faculty of Applied Science and Engineering, University of Toronto. His first step in a professional career was with the Fensom Elevator Co., of Toronto, where he remained about two years, leaving there to join the Toronto Street Railway Co., which concern he remained with for a short period. The next three summers were taken up with land surveying. In 1908, Mr. Clendening worked under Smith, Kerry, and Chace on the designing and construction of the transmission line connecting Point du Bois with Winnipeg and after spending about three years on this work joined the Canadian Westinghouse Co., on the installation of switching and other electrical apparatus in the Point du Bois power house. In the early part of 1912 he joined the Winnipeg Hydro-electric System, as sales engineer, then as distribution engineer, which latter position he has held up to the present time, with the exception of three and a half years' service overseas. He has just been appointed operating superintendent for the same system.

Mr. C. A. Clendening

Work is starting at once on a power house and laundry for City Hospital, Saskatoon. Estimated cost $37,000.

"Everybody Happy," especially the orphans

Events in the Wireless Field

Wire Mosquito Netting Forms Efficient Aerial

Tests having to do with the substitution of wire netting for the ordinary aerial wire, have proved extremely successful. Two strips of netting from six to fifteen feet long and from 18 to 36 inches wide suspended a few feet above the earth and a few feet apart were used.

Large Capacity

The effect produced relatively large capacity. Strips are spoken of as a condensing antenna. The efficiency was found to be greatly reduced when the strips were hung vertically instead of horizontally.

J. C. Warner, assistant physicist in the bureau of standards radio laboratory, reporting these tests, said:

"Experimental results show that a condenser antenna of small dimensions gives excellent results when used at wave lengths below 400 meters. At longer wave lengths it suffers by comparison with the coil antenna when the dimensions are kept small enough for portability.

Useless Alone for Directional Work

"It is useless for directional work unless used with a coil antenna, but may be used in places where the sharp directional characteristics of the coil are objectionable. By proper design and by taking precautions to keep dielectric losses low the effective resistance may be reduced to a value lower than can be obtained either with the coil antenna or the ordinary elevated antenna.

Low Resistance

"On account of this low resistance and ease of construction this form of antenna should be of great value in portable short-wave radio stations, such as are used for military purposes and on airplanes, although in the latter case some difficulty may be experienced in keeping down dielectric losses.

"It is evident that the study of this interesting form of antenna is by no means complete. Its use as a transmitting antenna offers a wide field for investigation, and a large amount of work remains to be done in following up the investigations which have only been started in this study."

Radio Will Play Part in Detection of Criminals

An indication of the part which radio is soon to play in the detection of fugitive criminals is supplied by an incident which took place in Woodstock, Ont., recently. A local radio enthusiast, while gathering the American baseball results for the day, picked up the description of a criminal wanted in Detroit, as it was broadcast by the chief of police of that city. Within one minute after the particulars were voiced by the Detroit chief they were in the hands of Chief Moore of Woodstock.

Radio Requirements for Ships

The radio service of the United States Department of Commerce and Labor requires that ships carrying 50 or more people plying between ports 200 miles or more apart be equipped with radio apparatus and to be in charge of a person skilled in its use. It also requires an auxiliary source of power, a means of communication between the radio room and the bridge, and two or more persons skilled in the use of the radio apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated. The enforcement of this law is under the immediate supervision of the Bureau of Navigation and is accomplished through radio inspectors assigned to the principal seaports on the Atlantic and Pacific Ocean, Gulf of Mexico, and the Great Lakes. They are required, as far as possible, to inspect the radio equipment before each sailing of a vessel which is subject to the act, to determine if the apparatus is efficient and affords proper protection to the passengers and crew.

Wireless Station for University of New Brunswick

A radio station at the University of New Brunswick, has been established as a result of the gifts of apparatus donated to the Electrical Engineering Department by F. P. Vaughan, M. Sc., of St. John. Professor A. F. Baird, head of the Physics and Electrical Engineering Departments at U.N.B., has spent a considerable portion of the vacation period in experimental work with the apparatus, and has succeeded in establishing an amateur station which has been heard by local amateurs, and which is expected to have a sending radius of approximately 150 miles when perfected.

Recently Professor Baird received the required license for which he had applied to the Navy Department at Ottawa. The license subject to the customary restrictions placed on amateur stations so as to prevent interference with established commercial stations, allows the operation of the station at the University at any time. The station has been registered under the call letters of IDO.

So far very little has been done in connection with the receiving portion of the set but signals from Arlington, Va., have been heard faintly. The complete set will be used in connection with the electrical instruction given this year at the University and will be available for research work along wireless and high frequency lines.

A feature of a forthcoming London, England, revue is to be a wireless number, in which genuine Marconi apparatus will form part of the stage "props."

A popular Gilbert Menzies Receiving Set—Two stages of radio frequency and one stage of audio frequency amplification render possible the use of indoor aerials or loop antenna. signals have been heard from 1000 miles.

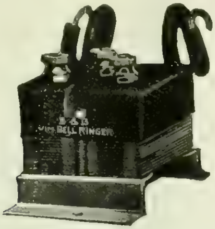
The Latest Developments in Electrical Equipment

Side Outlet Plug

A new side outlet plug has been placed on the market by the Anylite Electric Company of Ft. Wayne, Ind. It is designated as the "Anylite TP-2." Its construction is similar to that of the "Anylite" twin plug, the cover being of cold molded insulation and the legs of hard vulcanized fibre. The lower leg is threaded for a "Uno" shade holder so that the lamp and shade are held in correct relative position, the tap for appliances being made above the shade.

"Vim" Bell Transformer

The Betts & Betts Corporation, 645 West Forty-Third Street, New York City have recently brought out a bell transformer of the exposed core type. The primary and secondary terminals are brought out to a single block. The coil is small so as to reduce the copper cost, and yet have sufficient turns to keep the magnetizing current within limits. The cores have been given as much steel as possible without registering a core loss on the meter, and consist of stampings of sheet steel. Upon assembly, the coil and core are impregnated with an insulating varnish and the moisture is eliminated by a baking process.

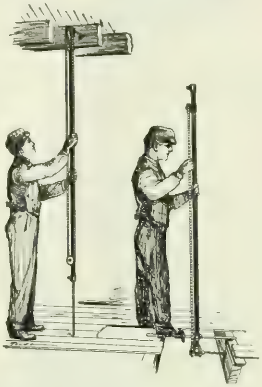


Moulded Tube Socket

The Kellogg Switchboard & Supply Company, Adams & Aberdeen Sts., Chicago, Ill., are marketing a molded tube socket for all standard four-prong-based vacuum tubes. Construction includes four German-silver springs held in position in deep grooves and prevented from making contact with the mounting surface. Nickel-plated binding posts are clearly marked for wiring. The wiring can be secured under the socket as well as the top binding post. The socket is 2 3/16 in. square with round corners and has a total depth of 1¼ in.

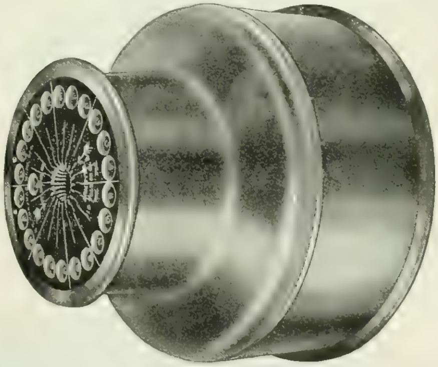
Chain Drive Boring Machine

The Dominion Electric Supply Company, Limited, 110 Queen St. W., Toronto, are marketing a chain boring machine with several distinctive features. The cut shows the method of operation for overhead and below-the-floor work. The manufacturers claim that more holes can be bored in an hour in this way than can be bored in a day by ordinary methods. Distributors are wanted for this machine.



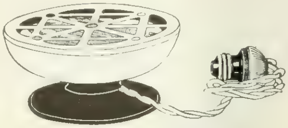
"Armeter" Testing Device

A new armature testing device has been placed on the market by the P. E. Chapman Electrical Works, Tenth and Walnut Streets, St. Louis, Mo. This is claimed to eliminate the step-by-step method, the test being made in one operation. In testing an armature the commutator is slipped into the circle of contact fingers located in the centre of the instrument. Individual lamps which are used as indicators are inserted in each section and 110-volt, 60-cycle alternating current is supplied. From the brilliance of the lamp the type of defects and their locations can be determined. A ground detector indicates grounds while a pilot lamp is used to show the brilliance that should be obtained in testing a coil with no defects. The instrument is marketed as a production instrument and is not adjustable to different sizes of armatures.



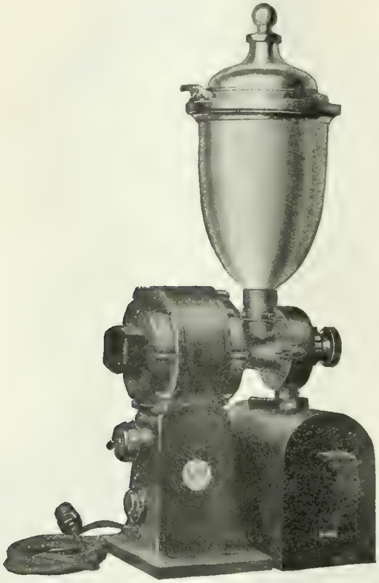
Hot Plate

The Betsy Ross Hot Plate has been recently placed on the market by the Central Flatiron Manufacturing Company, 200 Fifth Ave., New York. Its construction embodies a polished aluminum bowl and mahogany base, and removable top, enabling the element to be cleaned. The heating element is of Silchrome and is guaranteed for one year. A circular issued by the company describes its use as coffee urn heater, toaster, etc.



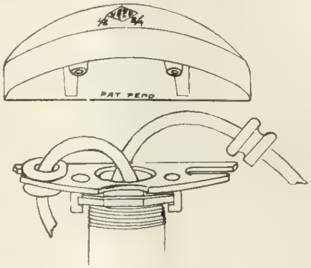
Electric Coffee Mill

An electric coffee mill has been placed on the market by the Valley Electric Company, St. Louis, Mo. The mill is equipped with a ¼ h.p. Valley Electric Motor, and is especially designed for groceries and delicatessen stores. Decorative features have not been neglected, hopper being of aluminum, and base painted red with black stripes. Hopper and can will hold 5 lb. On medium grinds the manufacturer claims a capacity of a pound of coffee a minute.



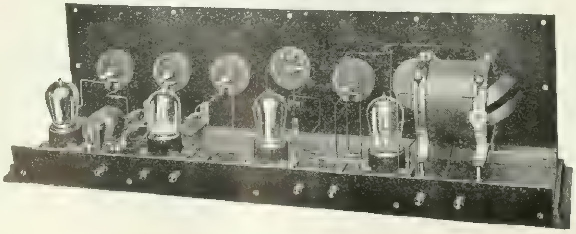
"Duo" Aluminum Hood

A two-piece aluminum wiring device consisting of a plate and a hood has recently been placed on the market by the Veco Manufacturing Company, 5 Quincy St., South Norwalk, Conn. Porcelain bushings are accommodated by three slots in the plate and the arrangement is such that bushings may be put in place after wires have been drawn through the conduit. The bushings are slipped over the conductors and the conductors then bent downward allowing bushings to rest in recesses in plate. The device is made in several sizes up to 6 in., each size fitting two separate sizes of conduit. When using the smaller conduit, a lock nut and bushing hold the conduit firmly against the plate. When it is desired to use a larger conduit, two supporting lugs on the bottom of the plate hold the larger lock nut and the conduits is screwed up to the plate. The hole for the smaller conduit thus acts as a bushing for the larger size.



Cream Whipping Machine

A useful household device, which whips cream, beats eggs and does similar work formerly done by hand, is being marketed by the Racine Universal Motor Company, 4642 Ravenswood Avenue, Chicago, Ill. It is built in different sizes to meet the needs of large and small families, coming in 3, 6, and 9-pint sizes. The manufacturers expect the larger sizes to be called for more by soda fountains, etc., the smaller being especially popular, for household use. Equipped with universal motor operating from a lighting socket.



Radio Frequency Set

The A. C. Gilbert-Menzies Co., 439 King St. W., Toronto, are marketing a radio frequency set of improved design. It is claimed that this set has an advantage in that the signals are not distorted due to non-regeneration. The outfit consists of two stages of radio frequency amplification, a detector, and one stage of audio frequency amplification. The audio amplifier is practically unnecessary except when loud speaker is attached.

Current News and Notes

Almonte, Ont.

The Bell Telephone Company is installing two new switch boards here. Mr. J. J. Gardiner, district manager, stated that a new overland cable is also in course of installation.

Ayr, Ont.

Accidentally coming in contact with a high tension wire while making some repairs to the hydro-electric system in Ayr recently, John Little, electrician, was instantly killed. At an inquest following the accident, the jury brought in a verdict of accidental death. and added a recommendation that the key for the lock on the emergency switch at the transformer station be kept in a suitable place outside the building so that there would be no delay in cutting off the power should it be necessary.

Calgary, Alta.

The Cunningham Electric Company of Calgary, Mr. G. M. Wilkinson, manager, recently sold 56 vacuum cleaners in two weeks. This was largely the result of an intensive house-to-house campaign carried out by two of Mr. Wilkinson's salesmen.

Fernie, B. C.

The East Kootenay Power Company are duplicating their transmission line. This involves a second line from Bull River to Coleman. and from Bull River to Kimberley. The addition is made necessary by the demand from mining companies in the vicinity.

Galt, Ont.

An electrical cooking demonstration was recently given by Miss M. E. Henderson and Mrs. M. J. Sheppard, of the Canadian Westinghouse Company, in the Hydro shop.

Georgetown, Ont.

A by-law was recently carried to loan Smith and Stone $40,000 to enlarge their present electrical supply manufacturing plant.

Hamilton, Ont.

Street railway receipts for the second quarter of the year fell below the expectations of city officials, according to figures received by W. H. Davis, city treasurer. The city's eight per cent of earnings for three months ending June 30, amounted to $20,005.28, as compared with $20,292.86 for the same period in 1921. It is stated that bus lines are partly to blame.

Discussion on Hydro power rates featured at a recent Board of Control meeting and a committee will meet the Hydro Commission to further discuss the proposed changes. Mayor Coppley remarked that the house holders were not being asked to pay any increase and the jump of $4 per horse-power was a burden which the commercial interests had to shoulder.

Ground has been broken at the new quarters for the Hydro at 12 King street east. Commissioner Ellis announced recently. The alterations and additions to the building will be rushed to completion, and it is expected that the department will be located in its new home by December 1.

Kitchener, Ont.

At a recent meeting of the Light Commission, Superintendent McIntyre reported that the peak load for July amounted to 7,304 h.p. Last year the peak amounted to 6,099 h.p. There have been recently added 60 new residential consumers, 6 new commercial consumers and 6 new power consumers of a total of 176 H.P.

London, Ont.

That the time is now ripe for the city council to take action to clear the streets of the downtown districts of all overhead wires is the opinion expressed recently by E. V. Buchanan, manager of the Public Utilities Commission. The Public Utilities will begin removing hydro wires from Dundas and Richmond streets, between Ridout and Wellington streets and the G.T.R. and Fullarton streets. The district will then be supplied with light and power by underground cables. With the hydro wires out of the way Mr. Buchanan believes the council will obtain results if they ask the telegraph companies to remove their mesh of wires from the main thoroughfares. He stated that the companies had expressed willingness to take action as soon as the city had removed the power wires.

Montreal, Quebec.

The third annual Canadian Telephone convention was recently held in Montreal. Mr. W. H. Winter, of Montreal, was chairman. Addresses were given by representatives of Canadian systems and various lunches, dinners and demonstrations completed an interesting programme.

The net earnings of the Southern Canada Power Company for the ten months ending July 31st., 1922, are shown to be $391,838, an increase of $88,389 over the earnings made in the ten months ending July 31st, 1921.

North Portal, Sask.

At a meeting of citizens of Portal and North Portal to consider the electric light proposition, committees were appointed to report on the terms the old company had to offer and to interview the Kenmare Co. regarding the extension of their wires from Bowbells north to Portal. At this meeting it was found that the Taylorton, Sask., mines, were not in a position to furnish light to the border towns. Geo. Fordyce reported that the Kenmare Co. were desirous of linking up their lines with Portal and North Portal via Bowbells, which is now supplied by this company, and were also anxious to extend their business to Flaxton en route and also to Lignite, Noonan, and Columbus, making the coal mines near Columbus the power centre.

Ottawa, Ont.

It is reported that the Hull Electric Company has acquired the riparian rights of Paugan Falls, on the Gatineau River and will in the course of the next year, establish a hydro power plant with an ultimate capacity of 150,000 horse-power. About two years will be required for the completion of the work.

E. McG. Quirk, of Montreal, has been chosen chairman of the board of conciliation appointed to inquire into the dispute between the Marconi Wireless Telegraph Company and its employees, some 300 men being directly affected, and from 100 to 200 indirectly. The employees are represented on the board by Thomas Taylor, of Toronto, and the company by Melville P. White, also of Toronto.

Port Arthur, Ont.

A new schedule of the Fort William street railway for through traffic has been prepared and came into effect on Friday, September 1st, when one-man cars were placed on the run between the cities. The schedule provides for a thirteen minute service.

Quebec, Que.

In a recent address before the directors of the Quebec Exhibition, Mr. E. A. Robert spoke as follows:

"We have in the province power resources untapped greater than can be used locally by the generations that will succeed us and it seems that the sanest policy for us to follow would be to develop these resources, use all we can locally and turn into cash to help us in developing in the province a portion of the power resources that will never be utilized otherwise."

It is reported that both the passenger traffic and freight earnings of the Quebec Railway, Light, Heat & Power Company show considerable increases as compared with the corresponding period last year. and due to the heavy tourist trade the parlor tourist train operating between Quebec and Ste Anne de Beaupre is showing very satisfactory results. Mr. W. J. Lynch, General Manager, reports that the ten new double truck cars, recently obtained, are improving traffic conditions in the city.

St. John, N. B.

The City Council met recently with Dr. J. B. M. Baxter, K.C., city solicitor, and discussed the terms of the proposed contract between the city of St. John and the New Brunswick Electric Power Commission for the delivery of ten to fifteen million kilowatt hours of electrical energy from the commission's development at Musquash. After the discussion, on the advice of the solicitor, it was decided that the council would meet again to determine what policy they would adopt as to the distribution of the current, and then the solicitor would meet with the power commission to attempt to straighten away some objections to the proposed contract.

St. Thomas, Ont.

Following a deficit of $525.71 for the month of August, it was decided to raise the St. Thomas Street Railway fares to 7 cents.

Saskatoon, Sask.

The contract has been awarded to Eugene F. Phillips Electrical Works. Ltd., for approximately 7,000 feet of armored cable and certain other material required for the extension to the electrical light distribution system of Saskatoon, Sask.

Sandwich, Ont.

Sandwich town council has agreed to grant permission to the Hydro-electric Commission to construct a spur line from Sandwich street, Sandwich, to Cadwell's sand and gravel dock upon certain conditions which are to be forwarded the Commission for approval.

Scarboro Township, Ont.

Scarboro Township Council is conferring with the Hydro-electric Power Commission of Ontario regarding the cost of Scarboro operating a bus service as a public utility on Danforth road, from the city of Toronto limits to Scarboro Junction. The road is in excellent shape, .Scarboro has Hydro power, and only erection of the poles and wires is necessary. The service would be patronized by Oakbridge, Kennedy Heights, Birch Cliff Heights and Scarboro Junction citizens, many of whom work in Toronto.

Toronto, Ont.

In a recent notice issued to the bondholders of the Toronto Railway Company, it was stated that six months interest on this Company's bonds was payable on the 31st day of August. 1922. at the rate of 6% per annum, in accordance with the decision of the Directors of the Company..

The company further states that the arbitration with the city of Toronto to fix the price for the railway company's street railway property taken over by the city, has now reached the stage where only the argument of council remains, all evidence having been put in. The Arbitration Board will reconvene to hear argument on the 19th of September.

Warkworth, Ont.

An agreement has been reached with James A. Goodrich proprietor of the privately owned electric plant of that village whereby the village is to pay Mr. Goodrich $4,000 for his franchise, which has between four and five years to run. The private interest will be taken over in the event that the Hydro by-law is passed, when it is put to a vote.

Welland, Ont.

The Welland Electrical Co. suffered a loss recently when someone threw a wire over their line at the corner of South Main and Fourth street. This made a short circuit which burned out a switch. The company is of opinion the deed was done maliciously for the wire was hooked to the line so that it could not fall off.

Winnipeg, Man.

The Eureka Vacuum Cleaner Company, Mr. V. R. Homersham, manager, recently moved from 408 Notre Dame Avenue, Winnipeg, to new quarters at 610 Portage Avenue. Mr. Homersham reports that his firm has placed large number of appliances in Winnipeg homes as the result of intensive operations.

Wiring Contracts Awarded

Barrie, Ont.

F. Carpenter $3,500 res., 183 Bradford Street East.

Bordeaux, Que.

J. A. St. Amour, 2171 St. Denis St., Mtl., $141,500 school.

Carleton Place, Ont.

F. A. Wilson, Ridgemont St. Ottawa, high school.

Charlottetown, P. E. I.

Palmer-Watson Electrical Co., 256 Queen St., add. to school on Prince Street.

Walter M. Walker. 21 Prince St., $5,000 res., School St.; $3,500 bungalow, Orlebar Street.

Cochrane, Ont.

J. Reed & Son, $3,500 res.; $5,000 res., 3rd St. & 7th Ave.; $3,500 res., 3rd St.; $3,500 res., 8th Ave.; $3,500 res., 11th Street.

Coniston, Ont.

Mr. Cunningham, $10,000 rectory, Nipissing Dist.

Downie Twp., Ont.

W. Gaul, Charles Street, Stratford, $3,500 res., 3rd concession.

Edmonton, Alta.

Carey Elec. & General Repairs, 9989 Jasper Ave., on Misericordia Hospital.

Hillas Elec. Co., B. L. Perry, H. W. Depew, Edmonton, $150,000 isolation hospital.

Galt, Ont.

Galt Elec. Gas Fixture Co., $19,000 railway stn., Main St.

Humber Bay, Ont.

Northern Foundry & Machinery Co., 152 Bay Street, Toronto, $3,500 pumping station, Church & Queen Streets.

Leaside, Ont.

Cdn. Comstock Co., Ltd., 10 Cathcart St., Montreal, $750,000 add. to auto plant.

Kentville, N. S.

Ken. S. Cook, $6,000 res., Main Street.

Kingston, Ont.

H. W. Newman & Co., 167 Princess St., on isolation hospital.

Kitchener, Ont.

J. Schweitzer, Waterloo, $5,800 res., Troy Street.

Otto Reiber, Waterloo, $4,300 res., Wilmot St.; $4,000 res., Louisa Street.

Mattell & Bierwagen, Cor. King & Young Sts., $35,000

Convention of Contractors and Dealers in Toronto, November 13 and 14

add. factory, South St.; $4,500 res., Wilmot Street.

Star Electric Co., King St. West $25 000 res., Queen Street North.

London, Ont.

A. C. Bryce, 393 Grey St., $5,000 res., King Street.

Maxville, Ont.

R. J. Desjardin, $3,500 res.; $1,500 show room, Fair St.

Mimico, Ont.

Warner & Fordyce, $4,500 res., Primrose Ave.; $3,500 res., Robert Street.

Moncton, N. B.

Duffy & McCarthy, Lutz St., $5,500 res., Highfield & Union Sts.

Edgar Le Blanc, Church St., $5 000 res., Church St.; $5,-400 res., High Street.

Montreal, Que.

A. L. Allard, 162 Mt. Royal E., $8,000 res., 499 Melrose Ave.

J. A. St. Amour, 2171 St. Denis St., $180 000 school & res., Boyer Street.

J. A. Anderson & Co., 205 Mansfield St., $500,000 council bldg., 255 Mountain Street.

Bergeron Electrical Works, 1074 Berri St., $12,000 res. & garage, St. Denis.

J. Bleau, Visitation St., $15,000 three flats, Sherbrooke St.

W. E. Booth, 34 Bottrel Ave., $75,000 five pr. semi-det. res., Hampton Ave.

H. A. Byron, 266 Durocher St., $8,000 gas station, Blvd ine Street West.

H. A. Bryon, 266 Durocher St., $8,000 gas station, Blvd. Decaire.

J. A. Champagne, 2599 St. Hubert St., $12,000 three flats, St. Valier Street.

A. De Repentigny, 615 Mt. Royal E., $12,000 res., Chabot Street.

E. Demers, 757 De Gaspe St., $7,000 cottage, Blvd. Pie IX.

J. Goldberg, 1091 St. Dominique St., $13,000 five flats, Henri Julien.; $10,000 synagogue, Bagg & Clarke Streets.

G. Houle, 200 Boyer St., $22,000, two res., Vendome Ave.; $16,000, two res., Victoria Ave.

Mt. Royal, Que.

H. P. Cassidy, 255 Regent St., Mtl., $7,000 to $8,000 each 52 res., Vivian, Wicksteed & Dobie Streets.

Niagara Falls, Ont.

Upper Electric Co., Ferry St., $5,000 each two stores & apts., Main Street.

Oakville, Ont.

B. E. Sprowl, $6,500 res., William Street.

B. F. Sullivan, $6,500 res., Spruce Street.

Oshawa, Ont.

Harris & Marson, 81a Parkway Ave., Toronto, $100,000 church, Centre Street.

Ottawa, Ont.

Mr. Bartlett, $5,000 res., Renfrew Avenue.

Dalhousie Electric Co., Dalhousie St., $4,000 res., Longevin Avenue.

J. A. L. Ellicott, Bank & Strathcona Ave., $10,000 three res., Aylmer Ave.; $4,500 res., Clarey Ave.

Garrioch & Goddard, Elgin St., $7,000 res., Ossington Ave.

E. Headly, 645 Echo Dr., $6,000 each res., Driveway; $9,000 two res., Windsor Ave.

W. Hoffman, Westboro, $5,000 res., Sunnyside; $4,500 res., Belmont Ave.

T. E. Hopson, 134 Bank St., $12,000 mission bldg., Slater St.; $7,000 altn. church & add. hall, Sparks Street.

Stan. Lewis, 63 Metcalfe St., $10,000 two res., Clarence street; $4,500 add. res., Gloucester & O'Connor Sts.; $5,000 res., Ivy Street.

E. G. Tressider, 58 5th Ave., $4,500 res., Roseberry Ave.

N. Young, $5,000 res., Ross Avenue.

Outremont, Que.

C. Page, 3246 Drolet St., $16,000 res., Hartland Avenue.

J. W. Tousignant, 637 Marie Anne E., add. scolasticat on 1983 Rachel Street East.

Regina, Sask.

Lorne Elec. Co., 1820 Smith St., $4,000 res., Elphinstone Street.

St. Catharines, Ont.

A. B. Cudney, 22 Thomas St., $3,500 res., 11 Taylor Ave.

Dunnell & Eckert, Sherwood Ave., $3,500 bldg., Haig St.

H. C. Holmes, 30 Ann St., $2 500 res., Wiley & Linden Streets.

St. Pierre Aux Liens, Que.

Vallee & Hamelin, 1867 St. James St. W. Mtl., $121,000 school, St. Pierre Aux Liens.

Sandwich, Ont.

Aitch & Co., Amherstburg, Ont., $7,500 res., Askin Blvd.

Sault Ste. Marie, Ont.

Rapid Electric, 725 Queen E., $3,000 res., Coulson Ave.

Penfold & McBride, 76 Pim St., $4,000 res., The Drive.

Taylor Bros., Gore St., $9,000 stores, North & Wellington Streets; $20,000 add. mission, Albert Street West.

Stratford, Ont.

Cook & O'Donoghus, Downie St., $5,000 res., Romeo St.

Toronto, Ont.

Canada Electric Co., 175 King St. East, $20,000 add. school, Malvern Collegiate. Contract price $537.; $90,000 office bldg., Bay St.; $600,000 office bldg., Richmond & Sheppard Sts.

Cavers & Harvie, 702 Brock Ave., on res. Killarney Ave.

Blagdon Electric, 2240 Queen E., $10,000 res. & garage, 12 St. Andrews Gardens.

Trenton, Ont.

Charles Bowra, 52 Simcoe St. N., $200,000 woll combing & washing plant.

Tweed, Ont.

Electric Installation Co., 279 Front St., Belleville, on alt. school.

Verdun, Que.

E. Demers, 460 Beaudry St., $10,000 flats, Galt Avenue.

E. Robillard, 255 Hamilton St., on three flats, 2nd Ave.; $12,000 two res., 2nd Ave.

W. Quesnel, Church Ave., $6,300 three flats, St. Joseph Street.

J. Quisnel, Church Ave., $6,300 flats, St. Joseph Street.

Wm. Rochon, 454 Lafontaine Park, $93,000 add. school & res. Treherne Ave.

Victoria, B. C.

Murphy Elec. Co., 603 Sayward Bldg., Vic., $3,500 res., Macauley Plains, Esquimalt.

Westmount, Que.

Sayer Electric Co., 87 Bleury St., $23,000 res., 17 MacGregor Street.

Windsor, Ont.

A. Cook, $6,000 each ten res., Church Street.

W. A. Lefave, 1231 Erie St., $8,000 res., Victoria Ave.; $22,000 church, 609 Dougal Avenue.

McKay McNaughton Electric Co., 115 Sandwich St. W., $15,000 stores and apts., Erie & Victoria Streets.

Winnipeg, Man.

Levvy Elec. Co., Ltd., 493 Portage Ave., on stores Portage Ave.; $20,000 seven stores, Garry & Ellice.

York Twp., Ont.

Patterson Electric Co., 43 Fermanagh Ave., $30,000 add. school, Humbercrest School.

Radio Broadcasting in Great Britain

"Great Britain will solve the interference problem in radiophone broadcasting by government control and regulation", according to A. P. M. Fleming, C. B. E., Manager of the research and educational department of the Metropolitan-Vickers Electrical Company, Manchester, England. Mr. Fleming represented England at the international convention of the Institute of Electrical Engineers and the International Electro-Technical commission at Niagara Falls.

"One of the things we have learned is to avoid the establishment of innumerable radio stations, with no plan of co-operation between them. Eight 1 1/2 kw. stations are contemplated and some of these will probably be built this year. These stations will be located in the principal cities throughout the British Isles and will be operated so as to eliminate the chaos usually found where no rules are in force.

"We have no such thing as broadcasting in Britain at present in the sense in which the term is used in America." he said. Government restrictions have prevented it, on account of the possible interference with the requirements of the navy, mercantile, marine, war services and aeroplane traffic. But the largest manufacturers of radio apparatus have co-operated with the British Government officials in working out plans for the proper control of broadcasting.

"The broadcasting stations will be operated on strictly regulated wave lengths and other set rules, which will be published for the guidance of radio receiver owners. Every radio set owner will be required to pay an annual tax, also, and there will doubtless be special restrictions applying in times of national emergency.

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30 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
30 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
25 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
15 h.p., 3 ph., 25 cyl., 220 volts, 720 r.p.m.
15 h.p., 3 ph., 25 cyl., 550 volts, 750 r.p.m.
15 h.p., 3 ph., 60 cyl., 220 volts, 1200 r.p.m.
13 h.p., 3 ph., 25 cyl., 550 volts, 700 r.p.m.
10 h.p., 3 ph., 66 cyl., 220 volts, 1333 r.p.m
7½ h.p., 2 ph., 60 cyl., 200 volts, 1120 r.p.m.
5 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.p.m.
5 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
3 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.pm
3 h.p., 3 ph., 60 cyl., 550 volts 1120 r.p.m.
3 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
3 h.p., 3 ph., 25 cyl., 550 volts, 1400 r.p.m.
2 h.p., 3 ph., 60 cyl., 550 volts, 1750 r.p.m.
2 h.p., 3 ph., 25 cyl., 550 volts, 1440 r.p.m.
2 h.p., 3 ph., 25 cyl., 550 volts, 1400 r.p.m.
1 h.p., 3 ph., 25 cyl., 550 volts, 1500 r.p.m.
1 h.p., 3 ph., 25 cyl., 110 volts, 1420 r.p.m.
1 h.p., 3 ph., 25 cyl., 220 volts, 710 r.p.m.
⅓ h.p., 1 ph., 60 cyl., 110 volts, 1725 r.p.m.
1/6 h.p., 1 ph., 60 cyl., 110 volts, 1725 r.p.m
1/6 h.p., 1 ph., 60 cyl., 110 volts, 1150 r.p.m

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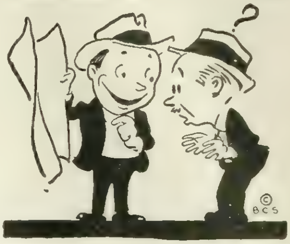

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Electrical Books---Reduced Prices

The following Books are Offered Subject to Previous Sale:

A Laboratory Manual of Alternating Currents, by John H. Morecroft, E.C. Published in 1912 by Renouf Publishing Company. 248 pages, illustrated. Price $1.00.

Baudot Printing Telegraph System, by H. W. Pendry. Published in 1918 by Whittaker & Company. **144 pages, illustrated.** Price $1.50.

Direct-Acting Steam Pumps, by Frank F. Nickel.. Published in 1915 by McGraw-Hill Book Company. **258 pages, illustrated.** Price $2.00

Direct Current Machinery, Theory and Operation of, by Cyril M. Jansky, B.S., B.A., 1st edition, published in 1917 by McGraw-Hill Co., Inc. 285 pages, illustrated. Price $2.00.

Electric Railway, by A. Morris Buck, M.E. Published in 1915 by McGraw-Hill Book Company, Inc. **390 pages,** illustrated. Price $2.50.

"Engineering Electricity," by Ralph G. Hudson, S.B., 190 pages illustrated. Published in 1920 by the John Wiley & Sons, Incorporated. Price $2.00.

Handbook of Machine Shop Electricity, by C. E. Clewell. Published in 1916 by McGraw-Hill Book Company. 461 pages, illustrated. Price $2.50.

"How to Sell Electrical Labor-Saving Appliances," by Electrical Merchandising, first edition, 115 pages, illustrated. Published in 1918 by McGraw-Hill Book Company, Inc. Price $1.00

Practical Electric Illumination, by Terrell Croft. First edition, published in 1917 by the McGraw-Hill Book Co. 225 pages, illustrated. Price $1.50.

"Practical Electrical Engineering,"—**Direct Currents. A manual for use in industrial and evening schools and for home study,** by Harry G. Cisin. **Just published by D. Van Nostrand Company. 324 pages, 68 illustrations. Price $2.00.**

"Practical Electricity For Beginners," by George A. Willoughby recently published by Manual Arts Press. **104 pages, illustrated. Price $1.00.**

Principles of Alternating Current Machinery, by Ralph R. Lawrence. Published in 1916 by McGraw-Hill Book Company. 614 pages, illustrated. Price $3.50.

Principles of Electrical Design—D.C. and A.C. Generators, by Alfred Still. Published in 1916 by McGraw-Hill Book Co 365 pages, illustrated. Price $2.00.

"Radio Phone Receiving." A practical book for everybody. Written by nine specialists. Recently published by D. Van Nostrand Company, 179 pages Price $1.50.

Radiodynamics—The Wireless Control of Torpedoes and Other Mechanisms, by B. F. Miessner. Published in 1916 by D. Van Nostrand Company. **206 pages, 112 illustrations.** Price. $1.50.

"Standard Wiring For Electric Light And Power", by H. C. Cushing, Jr. Twenty-Sixth edition, published in 1920. Reduced price, $2.25.

Telegraph Practice, a Study of Comparative Method, by John Lee, M.A. Published in 1917 by Longmans-Greene & Co. 102 pages. Price 75c.

Telegraphy—A Detailed Exposition of the Telegraph System of the British Post Office, by T. E. Herbert, A.M. Inst. E.E. Third edition. Published in 1916 by Whittaker & Company. 985 pages, 630 illustrations. Price $1.50.

"Theory and Calculation of Transient Electric Phenomena and Oscillations," by Charles Proteus Steinmetz. Third edition, revised and enlarged. Published in 1920 by McGraw-Hill Book Co., Incorporated. 696 pages, illustrated. Price $6.00.

"Testing of Electrical Machinery," **for non-electrical students,** by J. H. Morecroft. Fourth edition, revised and enlarged. Published by D. Van Nostrand Company, 1921 220 pages, 111 illustrations. Price $3.00.

The Dynamo (2 volume), by Hawkins & Wallis. Published in 1909 by Whittaker & Company. Price $3.00.

The School of Practical Electricity (Electrician's Course in 2 volumes. Volume 1. Published by Electroforce Publishing Company, Milwaukee, Wis. 410 pages, illustrated. Price- $3.00

The Practical Railway Spiral, by L C. Jordan, C.E. Published in 1913 by Van Nostrand Company 155 pages Price 50c

ELECTRICAL NEWS, 347 Adelaide St. W., Toronto, Ontario

Electrical News
Generation, Transmission and Application of Electricity

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Physician, Heal Thyself!

The shoemaker's child is proverbially the worst shod on the street and the electrical business seems to be following closely this well-established precedent. It is difficult to understand, however, how any salesman can work up enthusiasm calculated to interest a prospect in the merits of the article offered for sale when the salesman himself is not sufficiently sold on the article to have one in his own house.

Is it not possible that right here is the real cause of the difficulty some of our dealers find in selling appliances—they are not themselves "sold," they cannot speak from experience and, so, their arguments do not carry conviction?

A large group of central stations recently sent a questionnaire to their employees with a view to learning to what extent electrical appliances were used in the various homes. The result would seem to indicate a woeful lack of appreciation for the virtues of the products that they themselves speak of in glowing terms to their customers. report does not state how many questionnaires were sent out, but 490 were returned. It is reasonable to suppose that those who did not return them have no electrical appliances, or so few that they hesitated to make the admission. Of the 490 all but 3 possessed electric irons. There was then a big drop to 349 toasters, then another big drop to 203 vacuum cleaners. Then came air-heaters 159, washing machines 149, grills 133, percolators 128, ranges 105, water heaters 35, and dish washers 1. What, we wonder, is the matter with the dish washer? It does not speak very well for its merits when only one man out of at least 490 thought sufficient of his own arguments to instal one. There is something radically wrong here. Either the dish-washer is no good or the salesmen are no good. In either case the defect should be remedied with as little delay as possible.

It is likely enough that this particular condition—as unearthed by the questionnaire—is not an isolated one. If it is a general rule, however, that electrical salesmen, or men who are engaged in any capacity in the electrical industry have not sufficient faith in that industry and in its products to use them to the fullest extent, right there is where we have a sufficient reason why we are not making more rapid progress. It would seem as though our first task is to "sell" ourselves on the value of electrical equipment.

The Cost of Daylight

A very interesting article was read at the recent convention of the Illuminating Engineering Society, when attention was drawn to a phase of daylight illumination that is very frequently over-looked, namely, its cost as compared with the cost of artificial lighting. In this article a number of specific cases are compared, and the totals shown, item by item, of what it has cost to illuminate buildings of various sizes by daylight and what it would cost to illuminate them by electric light. In a number of cases the cost of daylight is considerably in excess of the cost of electric light.

It was not so very long ago that a badly lighted room, i.e., one into which very little daylight penetrated, was considered a useless room. It was overlooked that that room could be lighted quite as well and perhaps at less expense artificially. Indeed there are many advantages in artificial lighting over daylight. For example, we can get rid of shadows; we can illuminate uniformly and we can guarantee that the amount of illumination supplied is the same at all times of the day and night. If one were arguing against daylight, he could say, that at times it is unusually bright, at other times so dull that it requires to be supplemented by electric light; that if the heat of the sun plays directly upon the window the rooms are at times uncomfortably warmed, and that during certain summer months the room is uninhabitable; if the blinds are drawn to keep out the sun the room is darkened.

It has been said that direct sunlight has a beneficent effect on individuals, but this may be open to question; there is no doubt, however, that insufficient light, either daylight or artificial, has a depressing effect, whilst efficient, well regulated and properly directed light has a exhilarating effect.

The cost of daylight must be considered from many angles. In the average building it may be that the initial cost is practically the same, whether large window space is built in or not, though frequently this demands a change in design. From the heating point of view, however, a window must be considered something of a luxury, for the amount of heat dissipated through windows is very considerable, and as our coal situation gets more acute, this will demand a more careful scrutiny. Perhaps, however, the biggest expense in connection with natural daylight is where wells or daylight areas have to be maintained. This frequently monopolizes a very considerable percentage of the total area of the building, perhaps as much as one quarter or one third of the total already occupied by the building. If one figured the income to be gained from the rental of one third greater office space, it would probably pay for the illumination of this space by artificial light one hundred times over.

It is rather difficult to understand why this antagonism to artificial illumination should maintain its hold. It is not due in any sense to the fact that the cost is excessive for costs of artificial lighting have been reduced many times in recent years. A possible explanation lies in the inadequacy and inefficiency of artificial lighting installations in general. There have been comparatively few engineers who understand the essential details of illumination. The whole problem has been left to the salesman of this or that fixture, who naturally sees in every poorly lighted area an ideal opportunity for the application of his own product. Correct lighting is a big enough problem to demand much more specialization on the part of skilled engineers.

Well Begun is Half Done

The Electric Club of Toronto made a fine start on Wednesday Sept. 27 by opening the 1922-23 season with a full attendance. Some radical changes have been made in the conditions surrounding the operations of the Club, chief of which is the change of location of the luncheon, which is now held at the King Edward Hotel. The price of the luncheon has been increased somewhat on account of the more desirable location, but this did not appear to check the attendance at all adversely. The president for the year, Mr. E. M. Ashworth, was in the chair and in his opening remarks made an eloquent and forceful appeal to the members for their regular support and attendance. He urged them on the double ground of, first, the club's value to themselves through meeting men in their own line of business and becoming, so to speak, an integral part of the industry with which they were connected; and, second, the assistance it would be to the club by having their physical, as well as financial support. He felt that the time spent by the members at their Wednesday luncheons may well be counted one of the most profitable hours of the week.

The speaker of the day was Mr. H. H. Couzens, general manager of the Toronto Transportation Commission and of the Toronto Hydro-electric System, who dwelt chiefly with a phase of the electrical industry that is absorbing a great deal of attention at the present moment, viz:—the necessity for a properly equipped and new electrical building at the Canadian National Exhibition. Mr. Couzens outlined the steps that had been taken by the Electrical Supply Manufacturers' Association which, among other things, had sent out a questionnaire to the manufacturers asking them to commit themselves tentatively to the amount of space they would be prepared to use if a proper building were available. The exhibition authorities require a semi-guarantee from the industry that the whole space of such building would be occupied for a period of ten years, the rate also being approximately set. The questionnaires have not yet all been returned, but already over 20,000 square feet of floor space have been accounted for. Mr. Couzens felt confident that this could easily be doubled and that the industry could readily take care of 40,000 square feet of display area. When we consider that the actual area occupied by the booths in any of the Exhibition Buildings is anywhere from a half to a quarter the total area of the building, this means that anywhere from 80,000 to 160,000 square feet in area would be required, that is, a building 400 feet long and somewhere between 200 and 400 feet wide. This would be one of the largest buildings at the Fair and should occupy one of the most prominent positions.

Mr. Couzens spoke favorably of an idea that had been suggested by Mr. McKay, secretary of the Electrical Supply Manufacturers' Association, namely, that an Electric Home should be built in a quadrangle in the centre of the electrical building. Those who visited the Exhibition this year, and the new Pure Food Building, will understand how this could easily be arranged. In the Pure Food Building there were open quadrangles for lighting purposes of perhaps 30 to 40 feet square. If necessary, this opening could be enlarged and a model Electric Home built in as a permanent feature of the Electrical Building.

The speaker also instanced the drawing power of electric homes in electrical exhibits he had knowledge of in England. Figures had shown that 95% of the people who visited the electrical display were also keenly interested in the special features brought out in the electric home, well-wired and well supplied with household equipment.

The honorary secretary. Mr. T. R. C. Flint, briefly explained the result of the recent poll that has been taken in regard to location of the club and the price of the luncheon, which had resulted, as already noted, in the choice of the King Edward Hotel. The honorary treasurer, Mr. R. A. L. Gray, reported a very substantial balance of money on hand from the previous year's operations.

Mr. Julian C. Smith Honored

The progress of hydro-electric development in the Province of Quebec was the theme of many of the addresses at a complimentary dinner given a few days ago to Mr. Julian C. Smith, vice-president and general manager of the Shawinigan Water and Power Company, to celebrate his twentieth year of service. Mr. J. E. Aldred, president of the company, declared that never had anything been carried out in the field of conservation anywhere to compare with what had been done by Sir Lomer Gouin in establishing the great water reserve which bears his name. The Gouin dam multiplied enormously the natural resources of the St. Maurice Valley, and formed the greatest storage reservoir the world had ever seen. Premier Taschereau said that, in spite of a dry summer, the great reservoir established by the Gouin dam had given to industrial plants below it a uniform flow of 12,000 cubic feet. Continuing he said:

The province dreamt of the day when it would be independent of American coal. Water powers had been developed to only six or seven per cent. of their possibility. When more fully developed the problem would have to be faced as to whether such power should be exported or whether Quebec should say "Come and establish your industries here." He called on the business men of the country to study this question in the meantime.

High Voltage Testing Transformer

The highest voltage testing transformer equipment that has ever been sold is now being manufactured by the Westinghouse company at its main works at East Pittsburgh, Pa. This high voltage equipment is being built for installation in the new high voltage testing laboratory now being constructed on the grounds of California Institute of Technology at Pasadena, Cal. A potential of 1,000,000 volts to ground will be produced by this equipment, its capacity being 1,000 kv.a. or 1340 h.p., at this extremely high voltage. The apparatus will consist of four special 250 kv.a. 250,000 volt testing transformers connected together so that their individual voltage will be added. This arrangement requires that the transformer tanks be insulated from the ground, the insulation increasing as the transformer voltages increase. This will necessitate mounting of the transformers on wooden platforms at various heights from the ground, the last transformer being on a platform approximately 12 to 15 feet high.

Convention of Contractors and Dealers
in Toronto, November 13 and 14

The Application of Electricity in the Manufacturing Industry—7

Shoe Manufacturing Entails the Use of Many Light Machines and Small Motors Are Largely Used—Room for Improvement in the Lighting of Shoe Factories

The use of electric drive in shoe factories is comparatively recent, but notwithstanding, most plants of this type are now motor-driven.

It is a fact that in the application of electric motors to different industries there is always one outstanding, particular feature which makes this sort of drive especially applicable and suitable to that industry. Thus, as has been mentioned in these pages, in pulp mills, it is the economy of synchronous motors for grinder drive; in rubber mills it is the accurate and safe control that is afforded, and in woodworking plants the economy resulting from the application of an individual motor to each machine. There are, however, common advantages that are obtained. Neater arrangement, flexibility of the entire system and reduced costs, are all included in each electrical installation, in any industry.

In the shoe manufacturing industry it may be said that flexibility and ease of operation are prime requisities and electric power fulfils these demands to a great degree.

The possibility of running separate machines, or certain banks of machines, alone, is valuable, in a plant where orders fluctuate and demand runs from infants' soft soled shoes to heavy working boots. Sometimes night work is required in certain departments, and it is apparent that electric drive here affords a great saving from the wasteful method of turning idle shafting.

Factory cleanliness is an advantage of electric drive that increases production and makes for contented employees. in the use of motors, and included therein is the assumption of individual drive or at least group drive, all greasy and oily belting and shafting is done away with. Dust is eliminated to a great extent, and the entire plant is made cleaner and neater. More space is given near the ceilings with the resultant advantage of better illumination and fire protection.

A second advantage lies in the ease of installation of individually driven machines. Shoe factories as a rule are crowded affairs and only the more recent installations are definitely laid out. An increase in business demands the installation of several new machines to be placed wherever space is available, and it is much easier to run conduits to the machine than to extend the line shafting.

Manufacturing Processes

In the manufacture of shoes of all kinds, the processes are fairly well standardized. In some of the plants, however, there will be found machines that are more modern or machines that are designed to do mechanically the work that is sometimes done by manual labor, consuming very much more time. For instance, in one plant, a sole-grader is used that automatically stamps the gauge on them as quickly as they can be fed into it. This labor-saving device gauges all thicknesses of leather in half-sizes and the operator has only to glance at the number and place it in the proper rack. The increasing use of such machines may be directly attributed to the availability of electric power.

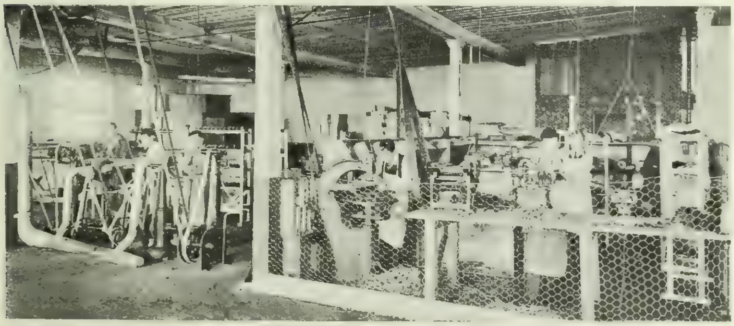
As has been said, however, the process of manufacture for each type of shoe is fairly well standardized.

The Course of a Shoe Through the Factory

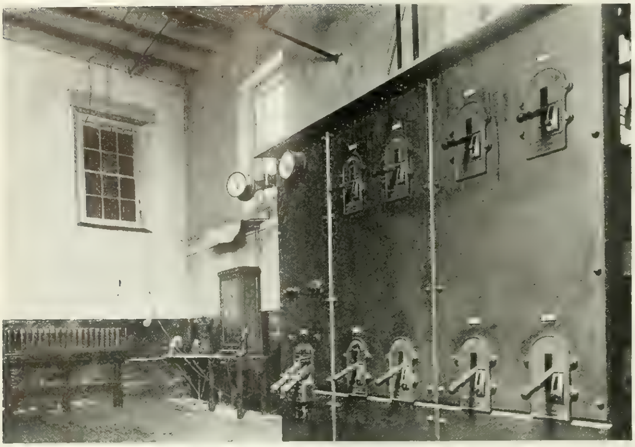
The start of shoe manufacture begins in the "upper" leather room. Here leather is distributed to the operators of the "clicking" machines. These machines are electrically driven and act in much the same manner as a metal punch. They carry dies, which cut out a flat piece of leather of such a shape that it will form nicely around a last to the required shape, i.e., for the upper part of a boot. Even before the days of electric drive, this process was largely machine work, and nowadays it is very rare indeed to find the various parts of the upper cut by hand. The power required for each "clicking" machine is not large; the writer has in mind one plant that runs two of small size from one 3 h.p. motor.

Skiving

After the different leather parts have been cut, some of the edges that will have to be turned or lapped over are "skived" or thinned down to a bevel edge. The edge of the material to be skived is fed to a revolving disc, which cuts it down to the desired level. This machine is also elec-



A department where soles are cut, channelled and breasted by machines. Waste is taken away by an electrically driven suction system.



Distribution board installed in an up-to-date factory. Automatic telephone system shown in background. There is plenty of room left for future extension.

trically driven and consumes relatively small amounts of power.

Perforating

The perforations in toe tips, vamps and wing tips are sometimes made by "punching" machines that cut out the whole design at a stroke. Another way of doing it is to use a "perforating" machine that works in much the same way as a sewing machine. As will be easily foretold by a comparison with the ordinary sewing machine motor, the motors are small, the principal requirement being steadiness of drive.

Cutting Linings

Shoe linings and other fabric parts are cut out by steel dies. Several layers of the fabric are laid out, one over the other, and placed in a stamping machine. The pressure must be sufficient to force the die through the entire thickness of the fabric at one stroke and this naturally requires a fairly powerful motor.

Stitching Department

In the stitching department, the various parts of the upper, whose production we have described, are brought together and stitched into one complete upper. These machines are more or less grouped, that is, driven by one motor for several machines. The motors are generally mounted on the floor, and drive a horizontal shaft, which is laid underneath the frames of the various sewing machines.

The shoe vamps are sewed to the uppers at this point, having gone through a similar process of cutting, and so on. The machines used are almost the same in construction.

Other machines that are included in the stitching department are the "duplex eyeletting" machine which attaches and fastens the eyelets to both sides of the shoe at one time, and the "lacing" machine, which laces the upper with a temporary lacing to hold all the parts in correct position while the sole is being made.

With this operation, the work of the stitching room is completed. The different lots of uppers are then sent to the making room.

Sole Leather Department

We have now seen the uppers fairly into the making room. All this time the soles and other parts of the shoes are being prepared for the final assembly by different processes. In the case of soles these are somewhat as follows:—

(1) Cut to shape by dies or on "rounding" machine.
(2) Tightened and straightened in "rolling machines."
(3) Reduced to uniform thickness in "splitting machine."

The inner sole and outer sole undergo practically identical processes. The tendency is to group these machines and drive from one motor, a fact which shows there is room for improvement, in the development of individual drive.

Miscellaneous Sole Processes

"Channelling" machines are used to cut two shallow channels around the edge of the inner sole. "Lip-turning" machines turn up the lips of the channels cut in the pre-

A sole-leather cutting room. The machine in the foreground is the grader. The other machines are the dieing machines which cut out the soles and top pieces.

The Bottoming room of a large factory—Here the sole is attached to the upper—Note the number of shoes en route.

ceding operation. The heels are formed from different layers of leather or other material and are cemented and nailed together in a "heel-building" machine.

Assembling

All the parts whose preparation has been described, are brought together in the Making Department. The shoes are here formed upon lasts to the shape that they have been ordered in.

The insoles are tacked to the bottom of the lasts by means of an "insole tacking" machine which drives the tacks automatically. The lining and counter are also secured to the last at this point. The last is then placed inside the upper and put upon the spindle of the "assembling machine." After assembling, which is largely a matter of having the seam at the heel properly placed, the shoe is passed on to the "pulling-over" machine.

The "pulling" machine is generally considered one of the most important in the whole process of shoe making. Its function is to correctly place the parts of the shoe in correct relation to each other, with some slight help from the operator. Tacks are driven to hold the upper securely in position.

Lasting

The assembled parts as attached to the last are now ready for the "lasting" process. There are two different machines for doing this work, the net result of which is to have the leather stretched smoothly over the last and held in position by tacks. All the surplus leather that has been pulled over the bottom of the last is trimmed by a small "trimming" machine. The lasting tacks are removed by a "tack-pulling and resetting" machine.

The operation does not by any means complete the process. It is not our purpose, however, to go into the technicalities of shoe-making to any extent, and it will suffice if a very brief description of the machines is given. Let it be noted that most of these are capable of electric drive, and individual drive—there is much room for improvement in the latter direction.

Here are some of the other machines used:—

(1) Upper stapling machine. Attaches wire staples.

(2) Goodyear welt sewing machines.

(3) Insole tack pulling machine. Draws insole tacks.

(4) Welt-beating machines.

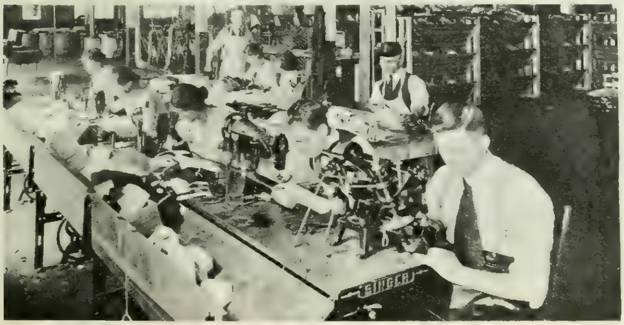
(5) Sole-laying machine. Cements sole in place for further operations.

(6) Rough-rounding machine. Trims outer sole and welt.

(7) Heel-rounding machine. Rounds heel.

(8) Channel-opening marhine. Opens outer sole for stitches. .

(9) Outside rapid locksmith machine. Stitches outer sole to welt.



A Fitting Department—The fitting of the uppers calls for very delicate hand and machine work. All the machines shown are driven by one slow-speed motor.

A Sole Leather Room—This department is placed in the basement of a large plant. Here the soles are cut, rounded channelled, tempered and so on, placed in boxes along with the counters and sent to the making room—Individual motor drive would do away with the belting shown in the photograph.

(10) Sole levelling machine. Removes unevenness from sole by rollers.

(11) Heeling machine. Nails heel in place.

(12) Heel trimming machine. Smooths back of heel.

(13) Heel breasting machine. Trims front of heel.

(14) Edge-trimming machine. Bevels edge of heel.

(15) Buffing machine. Removes stains and markings.

(16) Finishing machines. Polishes and cleans.

(17) Power stamping machine. Stamps trade mark on shoe.

A thoroughly modern factory includes all the machines mentioned above, and if many different types of shoes are manufactured, the number is greatly added to.

A Typical Factory

One plant that manufactures women's and children's shoes exclusively, uses 160 horse-power. The switchboard and distribution system is right up-to-date, consisting of a Westinghouse switching panel and indicating instruments. A large number of small motors are used, but there is room for many more, as some of these are used for line shafting.

This plant was originally driven by a 30 horse-power steam engine, and the change to its present status is an indication of the progress that has been made in both the shoe and electrical industries.

Another plant, manufacturing men's and boys' heavy shoes, has adopted electric drive exclusively, after 8 years of experience. 125 horse-power is used, and the superintendent reports that very little servicing is required on his equipment.

Some Canadian shoe manufacturing organizations rank among the largest in the British Empire. A Montreal concern runs two factories with a total capacity of 8,000 pairs a day. The total power used is upwards of 1,000 horse-power and included many special applications, such as electrically driven humidifiers, heaters, fans and so on.

Many factories are equipped with suction systems which include a central fan, driven by a heavy motor. A strong draught is required to lift chips of leather and the motor power for even a small plant of this type runs up to 35 or 50 horse-power. Only a small percentage of factories are equipped in this way, and there is a wide field for this application.

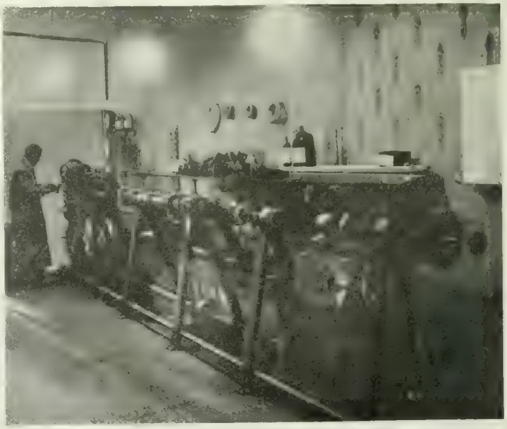
Lighting

Shoe factory lighting is not what is should be. The fault does not lie with the factory owners, as most of them are willing to install the latest improvements of any nature. There are a few plants equipped with indirect units giving desirable intensities, but the majority are "getting along" with a few badly placed drop cords. The possibility of increasing the available illumination by suitable painting of walls, has also been hardly touched upon. The shoe manufacturing industry is peculiarly susceptible to the effects of bad lighting from a production standpoint, as regards rate and spoiled shoes, and it seems certain that there will be great changes in this direction.

A few of the most modern factories are equipped with automatic signal systems, which can call individuals from known departments, or operate general calls throughout the factory. There is a great advantage in this system in time saving, and the provision of these signal systems for shoe factories provides another opportunity for the electrical industry.

Extent of the Shoe Manufacturing Industry

Viewed as a whole, the magnitude of the shoe manufacturing industry in Canada is surprising. The figures speak for themselves. There are over 200 concerns engaged in the manufacture of footwear and the average daily production is well up to 200,000 pairs. These figures are full of meaning for the electrical industry. A daily production of 200,000 requires, counting accessory apparatus as well, about 30,000 h.p. This power is not all electrical—that is the end to be achieved, together with the provision of adequate lighting, protective and signalling equipment. The shoe manufacturing business is as are many others—a fertile field awaiting cultivation by the electrical industry.



The motor-driven machinery of a shoe repair plant

28,000 h. p. Turbines at Great Falls

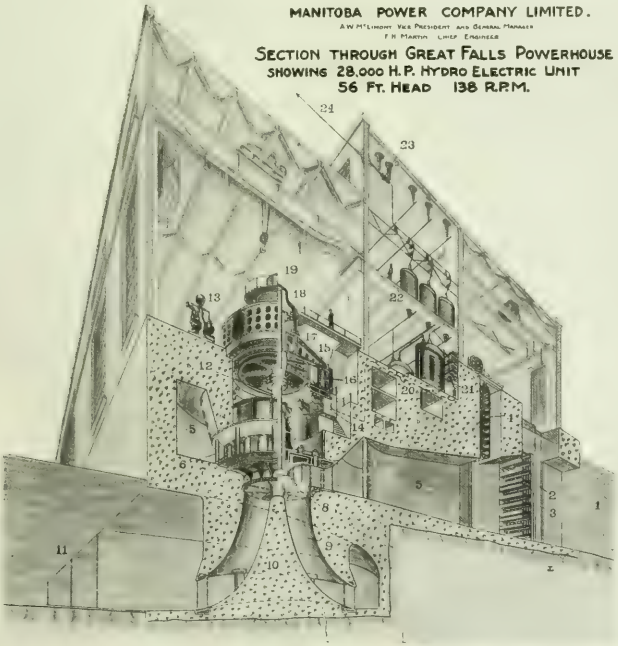
Design Embraces Latest Features of Turbine Development—High Speed Noteworthy—Comparison with Cedars Rapids Turbines

The tendency in the hydro-electric field during recent years has been towards larger turbine units of the vertical-shaft, single-runner type. This has been made possible by the development of the direct connected hydro-electric unit and the satisfactory solution of the thrust bearing problem. With this type of unit, operating under medium and low heads, the question of speed is, for economical reasons, very important. Higher speed means smaller and more efficient generators, lighter overhead construction, and smaller power-house cost. The limit of speed obtainable for large capacity units under low heads has been, and still is, determined by the limits of turbine development. However, great progress has been made by turbine designers within the last few years, and the most striking example of progress is to be found in the new development of the Manitoba Power Company.

Until quite recently the standard turbine runner for low head installations has been the Francis mixed-flow, i.e., inward and downward-flow type. With this type of runner specific speeds around eighty English units have been in use for some time with high efficiencies. Beyond this point, however, progress has been very slow until the recent development of a new type high speed runner, generally known as the "propelled" type,—its name resulting from the close resemblance it bears to a marine propeller. It has three to six vanes mounted on a central hub, and is usually unshrouded, i.e., there is no surrounding band. The new units at Great Falls are to be equipped with this new propeller type of runner.

The new 28,000 h.p., units which are being installed by the Manitoba Power Company, will develop this power when operating under a head of 56 feet, at 138.5 r.p.m., as compared with 75 r.p.m., using the type of runner employed in the Cedars Rapids plant of the Montreal Light, Heat and Power consolidated. The units in this plant when installed eight years ago were of the highest speed type then available. The Cedars units, as originally designed, would develop about 27,500 h.p., and the last units installed in that plant about 28,800 h.p., under the higher head of 56 feet, so that a comparison with the Manitoba units is a fair criterion of the relative merits of the types of runners used in the two installations.

The most striking variations from the Cedars units lies in the design of runner, speed vanes and draft tubes, and the dimensions of the generator. In this turbine there is a much larger whirl chamber between guide vanes and runner vanes. The runner is of the Moody diagonal type in which, neglecting the whirl velocity as before, the flow is diagonal at intake and axial at exit. The speed of revolution of this runner is remarkable,—the circumferential velocity of the vane tips being about 7,000 feet per minute, nearly twice the spouting velocity of the water for a head of 56 feet. This high speed results in a much smaller generator than for Cedars, the outside diameter of the stator frame being only 24 feet and the flywheel effect of the generator rotor 18,000,000 pounds-feet squared. The higher speed also allows the use of a direct connected exciter, whereas separate water-wheel driven exciters are used in the Cedars plant. There is no solid speed ring for this unit. The speed vanes are


MANITOBA POWER COMPANY LIMITED.
A W McLimont Vice President and General Manager
F H Martin Chief Engineer
Section through Great Falls Powerhouse
showing 28.000 H.P. Hydro Electric Unit
56 Ft. Head 138 R.P.M.
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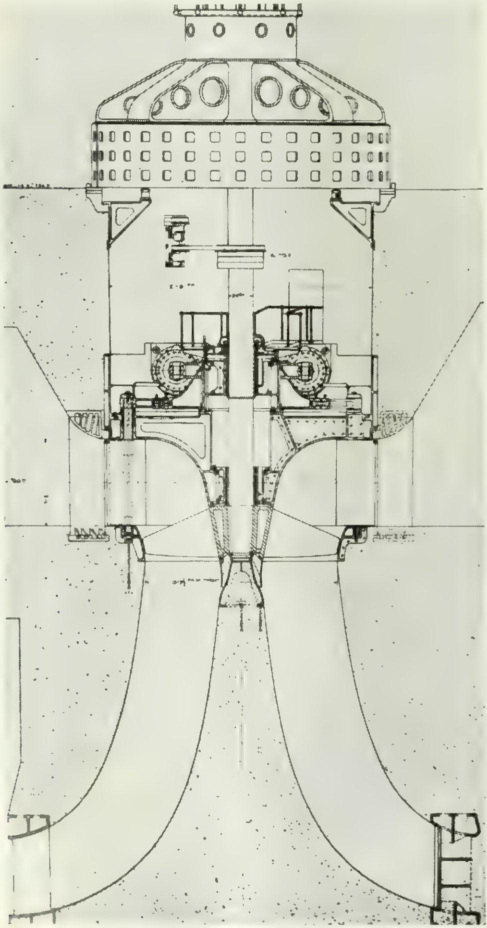
A sectional view of the power house of the Great Falls development for the Manitoba Power Co.

cast separately, the ends being imbedded in concrete and anchored by foundation bolts. The draft tube is of the Moody spreading type with central concrete cone running up to the runner, and with supporting cast iron vanes for the surrounding apron.

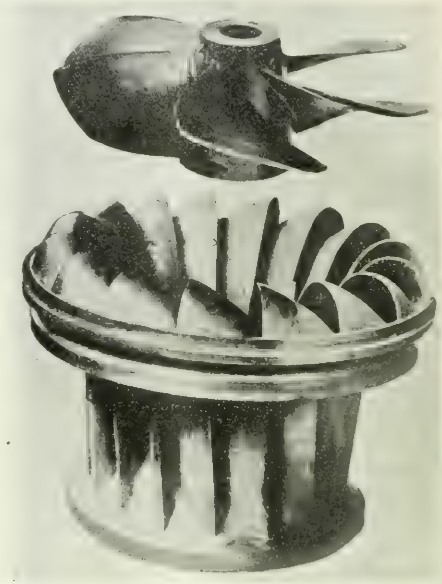
The propeller type runner is very simple as compared to the Francis type. The outer band is eliminated, and the runner vanes have very little curvature, thus cutting down the liability of corrosion. The number of vanes is only six as compared with sixteen for Cedars. This means much wider space between vanes, and little danger of clogging from ice or debris. The intake racks also may be spaced wider in proportion.

Runner Cast in One Piece

The throat diameter of the Great Falls runner is slightly greater than for Cedars, being 189½ inches, but the overall height is only 4 feet 5¼ inches, as compared with 11 feet 9 inches for Cedars. It is made of cast steel in one piece and the estimated weight is 65 000 pounds, less than half the weight of the Cedars runner. Another advantage of this type of wheel is its great mechanical strength on account of the longer connection between vanes and hub, and the little overhang of the vanes as compared with the Cedars type. The separate speed vanes furnished with their units represent a new style of construction used here for the first time. These vanes are built in with the forms for the concrete, and securely anchored by long foundation bolts. Lugs are cast on the vanes at the top and fitted with adjusting screws for the proper setting of the pit liner with relation to the draft tube ring. This construction means a considerable saving in material and machine shop labor but, on account of the greater erection cost, it will probably only find application in large units of the type under discussion.



Part section of generator, turbine and draft tube



Comparison between Propeller and Francis types of turbine runners

The heaviest casting for this unit is the head cover, which is supported by the pit liner, and in turn supports the lignum vitae bearing for the main shaft. It is built in halves on account of its large size. Its lower surface takes a cone shaped form to conform with the flow lines of the water. The forged steel shaft for this unit is slightly smaller than for Cedars even with the much greater horse-power, its diameter being 24 inches, compared with 25 inches for Cedars. The cast steel guide vanes are the largest yet constructed, their height being 7 feet 1¾ inches and width 4 feet 7 inches. They are fitted with separate stems which rotate in bronze bushed bearings in the distributor plate and head cover, and are connected by levers and double acting shearing links to cast iron operating ring. The shearing links are so constructed that in case of any obstruction lodging between two guide vanes when the gates are closing, or guide vane and speed vane when the gates are opening, the connecting link will shear before any damage is done to the rest of the mechanism.

Special Features of Units

There are other special features of these units which should be mentioned. The guide vane bearings are assured of an ample supply of grease at all times by the use of the Taylor pneumatic greasing system. With this system an air operated grease gun is supplied for each unit with the necessary piping to give a separate lead to each bearing, so that each bearing may be greased independently by a plug cock. The high pressure used ensures adequate lubrication with a minimum of operating labor.

Another feature is the automatic method used for changing from governor control to hand control, or vice versa. This is effected by the use of hydraulically controlled needle valves in the governor pressure and exhaust lines, instead of the old type with gate valves. With the old arrangement two or three men were needed to change the control, but with the new device one man can do so with ease.

The bypass and receiver provided on the governor pressure system is also worthy of mention. This consists of a needle valve discharging a certain quantity of water at all times into a cylindrical receiver connected with the sump tank. The object of this device is to allow constant operation of the pumps without overheating. There is circulation of water through the pumps at all times and the pressure rise is considerably less on account of this bypass.

The total weight of one of these turbines, exclusive of draft tube vanes, governing mechanisms and pumping system is about 630,000 pounds. This reduction in weight from the Cedars unit is largely due to the new type of runner and the separate speed vanes.

The Use of Electrical Appliances by Utility Employees

The slogan "Do it Electrically" is becoming more and more a by-word in the scheme of things, especially in localities where electrical energy is produced on a large scale and distributed at very low cost to the ultimate consumer.

Electrical appliances are manufactured to-day to perform almost every function in the home and factory and the use of these is spreading with remarkable rapidity through the selling effort being put behind them.

Public Expects Electrical Men to Use Appliances

One naturally looks to the central station body for reliable information relating to the operations and economical features of electrical appliances and generally expects the employee with whom contact is made to be fully informed on all the points about many appliances.

It is reasonable to thus suppose that employees of central distributing stations are quite familiar with the various standard appliances, as they would be expected to be the first to equip their homes with such devices. They would wish to become familiar with their operating properties and, secondly, out of loyalty to their employer to advertise the product he has to sell. Such at least was the opinion as regards the employees of Hydro municipalities until a survey was made of the principal ones to ascertain the facts.

Electrical Appliances Used

Cards were distributed to be filled in by employees, to indicate what appliances were being used. Out of 490 cards returned the following appliances were shown to be in use:

Irons	487
Toasters	349
Percolators	128
Grills	133
Vacuum Cleaners	203
Water Heaters	35
Dishwashers	1
Air Heaters	159
Clothes Washers	149
Ranges	105
Refrigerators	2
Miscellaneous	20

These results show that a great deal of effort must be put behind sales to electrical people themselves before we can expect others to accept the theories and sales arguments used to dispose of electrical appliances.

Time Payment Plan Necessary

To further the sale to their own employees, the Commission has instituted the time payment plan on large appliances, similar to that used by most Hydro shops in selling to consumers and every shop will find it necessary, to get the best results, to institute a similar plan if one is not now in operation.

Let every shop begin the task or educating its employees into the full uses of appliances in the home. If we sell the idea to ourselves, our own enthusiasm for promoting the sale of appliances will increase without measure and the public will place full reliance in the sales arguments used to dispose of such appliances to them.

Wireless Controlled Bombs in Next War

An air ministry expert claims that wireless controlled flying bombs, directed with mathematical accuracy from a distant base to their objective, are a certainty of the next war.

After referring to experiments made in the United States, Great Britain and France, with airplanes directed from the ground by wireless, and mentioning that in France recently an airplane, thus controlled, flew nearly 300 miles, he continues as follows: "Wireless control of air craft has infinite possibilities. It means in the near future, we shall have machines that are simply flying bombs directed by wireless. They will consist simply of airplane wings, sufficient to lift the weight to be carried, and an engine sufficient to carry the bomb to the place that has to be attacked. The machine will be fitted with a wireless appliance that sends out repeated signals from which the position of the machine can be judged to a nicety by the directional wireless apparatus. It will be steered with exactitude to its objective and then dropped with disastrous effect. Nothing will be able to stop such a machine except a direct hit from land guns or the shooting away of its wireless by a piloted airplane, both of which will be exceptionally difficult at night.

"There is a possibility that the controlling wireless may be jammed by a defence station, but this is problematical. Tests are now being carried out with the wireless ray which will, when sufficiently perfect, make a wireless absolutely secret and incapable of being jammed.

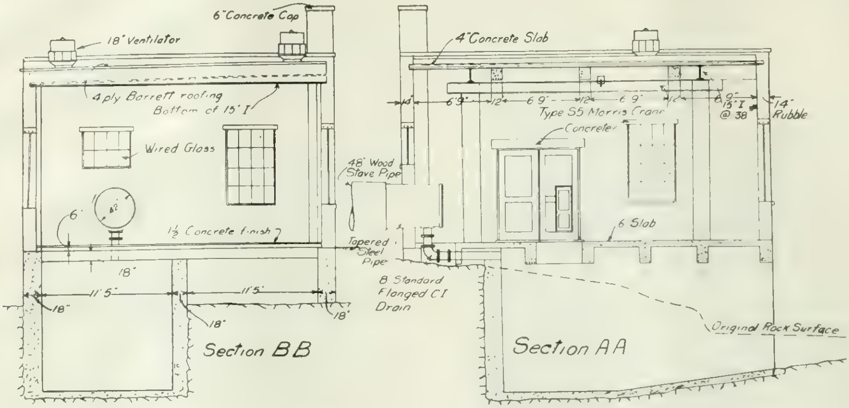
"Great flights of these bombs will be launched in the air under the control of one man. I can foresee a naval battle of the future between on one side, torpedoes and vessels, designed for ramming, controlled and steered by a pilot in an airplane thousands of feet up, and, on the other side a fleet of ships that has to rely on gun fire. The only difficulty of wireless control is that a torpedo ship or flying bomb cannot be steered against a moving object unless that object can be seen. That is why control of the flying bombs or sea torpedoes against a steaming fleet will have to be undertaken from the air."

22nd Annual Convention of Contractors and Dealers

The National Association of Electrical Contractors and Dealers are holding their twenty-second annual convention in Cincinnati, Ohio, on October 11, 12 and 13, 1922.

Hamilton Electric Home Sold

Those who were privileged to inspect the wonderful Electric Home recently shown by the Hamilton electrical industry will be interested to know that the Home has since been sold for $13,500, without furniture but including electric range, two electric mantels and the electric water heater. This Home was illustrated and described in the "Electrical News" of June 15th.

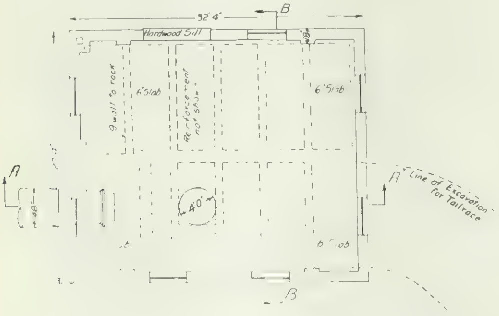


Sections of Thessalon Power House

Hydro-electric Plant at Thessalon, Ont.

The Thessalon hydro-electric power development, located on the Little Thessalon River at the village of Little Rapids, Ontario, is an interesting example of a small development for municipal purposes. Mention of the project has previously been made in these columns, but it is only recently that details of the work have come to hand.

The work entailed includes dam, head works, pipe line and power-house. The dam is of concrete and the use of field boulders, of which a large number are on the site, is allowed. It appears that rock excavation will not be necessary to any considerable extent. The existence of a burned log chute, and an old dam are features that have some bearing on the amount of work necessary by the contractor. A total width of approximately 190 feet is spanned by the dam, of which 62 feet is spillway.



Plan of Thessalon Power House

The pipe line is of the wood stave type, 1½ inch thick, of B.C. fir. Guarantees of watertightness of joints at power-house entrance, head works and pipe line itself, for 70 foot head, are required from the contractor. The pipe line is approximately 390 feet long and supports rest on rock. Elevation at dam end is 93.07, at power-house end, 62.0.

The power-house is to be built 32.4 feet by 27.4 feet, 16.4 feet high. Walls of rubble masonry to roof are specified, with an option of 9 inches hard stock brick. Floor is of concrete with a 1½inch surface coat. Roof is a 4 inch slab, covered with pitch, tarred felt, and gravel. The accompanying illustrations show further construction details.

The contractor is required to furnish 30 stop logs, and 12 logs for the head works. These are fitted with lifting casting, and a hardwood sill is provided at bottom of chocks.

James, Proctor and Redfern, Limited, are the consulting engineers.

First Meeting Toronto Section A.I.E.E.

The Toronto section of the American Institute of Electrical Engineers held their first meeting for the Autumn season on September 29th., in the Electrical Building, at the University of Toronto. Mr. Schnebly, chief equipment engineer of the Northern Electric Company gave a talk on Automatic Telephony. The address was well illustrated with lantern slides.

Radio Inspector for Quebec

Mr. D. McWilliams manager of the Canadian National Telegraphs, Quebec, has been appointed radio inspector for the city and district of Quebec by the Radiotelegraph Branch of the Department of the Naval Service, Ottawa.

Mr. McWilliams' experience dates back to the early stages of wireless in Canada. He served under the Marconi Co. on the Labrador Coast, Halifax, N. S., St. John, N. B., and as officer-in-charge at Quebec for two years in succession. Being a professional telegraphist and a certificated wireless man, the appointment made by the department should meet with general approval.

Experiments with Slide Wire Bridge

Messrs Crompton & Co., Ltd., Chelmsford, England, have published a handbook entitled "Experiments With the Slide Wire Bridge." It is written by Mr. David Robertson, D.Sc., M.I.E.E., Professor of Electrical Engineering in the University of Bristol, and is specially designed for use in the electrical laboratory. Price, three shillings net.

What Does Daylight Cost?

We Regularly Hear About the Cost of Electric Light but Rarely Consider that Daylight Also Involves a Large Expenditure in Capital and Maintenance

By M. LUCKIESH and L. L. HOLLADAY*

In the study of lighting it must often occur to some of us that natural lighting costs something, still relatively few persons appear to be conscious of its cost. How often does the consumer of artificial light bring up the question of cost without even hinting of applying this unwelcome characteristic to natural lighting!

In fact many times we have been met with the statement that natural light "costs nothing." This is true quite generally outdoors but is rarely true indoors. Many items contribute to the cost of natural lighting such as the greater cost of constructing windows and roof-skylights than plain walls and roofs respectively; the cleaning and replacement of glass; the greater loss of heat from glass areas than from ordinary walls and ceilings; the valuable wall-space and ground-area consumed by windows and light-courts respectively; and various other factors. Furthermore natural lighting fails at the end of each day and is often inadequate during the day and its distribution in interiors is not often ideal.

But it is not the aim of this paper to discuss the advantages and disadvantages of natural lighting. Such a discussion would lead far afield and would finally become entangled in opinions and speculations. The aim is to compare the cost of natural lighting with that of artificial lighting.

Cost of Natural Light

In estimating the initial cost of natural lighting obtained by means of windows. we include the cost of window-frames, sash, glass, accessories, trimmings, installation and painting, less the cost of wall and plaster replaced by the window. To this initial net cost of window is added the cost of extra radiation and heating system required to supply the increased heat loss of window surface over wall-area. Overhead skylights are treated in a similar manner.

The annual cost of natural lighting includes the interest at 6 per cent on the net initial cost of windows and heating system, net annual repair and depreciation of windows and additional heating system, the cost of washing of windows, and the cost of fuel to supply the additional heat loss.

Strictly the cost of artificial lighting used to reinforce natural lighting in the daytime should be charged to natural lighting thus reducing the costs of artificial lighting and increasing those of natural lighting. This applies to some extent to all interiors but this cost has not been charged to natural lighting. However it is included in the cost of artificial lighting.

We have not included in the cost of natural lighting such items as window-shades, the spoilage and cleaning of interiors and furnishings due to dust and to leaks and various related items. We have confined the maintenance charge solely to the window and sky-light areas.

Cost of Artificial Electric Lighting

The initial investment of electric lighting includes the cost of electric wiring and cabinets, wall and ceiling fixtures, table and floor lamps, shades and reflectors, and other similar equipment.

The annual cost of electric lighting includes the interest on the initial outlay, depreciation and repairs, lamp renewals, and the cost of electric energy.

The cost of artificial lighting includes even those which could be justly charged to natural lighting when the former is used to reinforce inadequate natural lighting in the daytime. This applies to some extent in all interiors, for example in basements and closets of residences, in hallways. in offices, in hotel rooms, etc., natural lighting in the daytime is often reinforced by artificial lighting.

SEVEN-ROOM FRAME HOUSE WITH
HOT-WATER HEAT

	Natural lighting	Artificial lighting
Initial cost of installation	$601	$265
Total annual cost of lighting	93	75

Natural Lighting

In estimating the cost of natural lighting in residences let us consider first a modern two-storey frame building, about 27 feet x 30 feet plan, which includes a living-room, dining-room, kitchen, three bedrooms. a bath, hallways, basement, and front and back porches. In this house there are 14 windows 36 inches x 57 inches, six windows 30 inches x 42 inches, and 7 windows 33 inches x 24 inches, or a total of about 288 square feet of window area. The cost per window for these three sizes are $27.75, $17.00, and $10.75 respectively, or about $1.95 per square foot of window. Deducting $0.37 per square foot for weather-boarding and plastering replaced by window, the net costs respectively for each size of window are $22.50, $13.75, and $8.70 or about $1.58 per square foot of window. Since there are 288 square feet of window surface, the initial net cost of windows is $455. According to our estimates and assumptions the interest at 6 per cent upon this initial investment of $455 is $27.30; the depreciation at 2.83 per cent is $12.85; the repairs and painting of these 27 windows per year,. less the cost of painting the weather-boarding is about $6.25; and the cost of washing them four times a year is about $11.50. Therefore the total cost of maintaining them is $57.90 per annum.

According to our assumption of temperature differences and radiation our estimates indicate that 0.283 square feet of additional radiation is required for each square foot of window area to supply the net heat loss chargeable to windows. Assuming the cost of a hot-water system to be $1.80 per square foot of radiation the initial cost of heating system would be $0.51 per square foot of window or a total $146 for the 288 square feet of windows in the house to supply the net heat loss due to windows.

The annual charge for heating these 288 square feet of window area would include interest upon the $146 at 6 per cent or $8.76, depreciation at 3.4 per cent or $4.97. repairs of about $0.82, and the cost of coal at $10.50 per ton when the furnace is operated at half capacity for seven months of the year or about $20.70; or a total annual cost of supplying the heat lost through windows of about $35.25.

On summarizing we obtain the costs of natural lighting presented at the beginning of this section.

Artificial Lighting

In estimating the cost of lighting this house by electricity let us assume first a meagerly equipped home but somewhat above the average as shown by a survey which is now in progress. We assume for this home a ceiling-fixture, two portable lamps and two convenience outlets for the living room; one ceiling-fixture, one portable and one convenience outlet for the dining room; one ceiling-fixture and one convenience outlet for the kitchen; one ceiling-fixture, one portable lamp, and one convenience outlet for each of the bedrooms; two wall-brackets in the bathroom, one ceiling-fixture and one convenience outlet in the hallway; one ceiling-fixture on the porch; three drop cords in the basement. According to our assumption these represent an initial cost at $5 per outlet of $100 for wiring; $100 for fixtures; and $65 for portables; or a total initial cost of $265.

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*Of Nela Research Laboratories, before I.E.S. Convention, Swampscott, Mass.

The annual charge against electric lighting includes interest at 6 per cent on the invetsment equal to $15.90; depreciation on the wiring at 3 per cent., depreciation on the portables at 5 per cent, depreciation on the fixtures at 4 per cent or a total depreciation of $10.25 per annum; an annual repair of $7.90; lamp renewals of $4.35; and the cost of 160 kw.h. of energy at $9.08 per kw.h. or $36.80. Therefore the annual cost of electric lighting is $75.20 according to these assumptions. A summary of total costs is presented at the beginning of this section.

SEVEN ROOM BRICK HOUSE

	Natural lighting	Artifical lighting
Initial cost of installation	$658	$610
Total annual cost of lighting	111	120

In order to obtain a further comparison of the natural and artifical lighting of residences we have considered a more adequately lighted house. A total window area of 374 square feet is assumed and a more elaborate electric lighting equipment was provided.

Assuming the same conditions as in the previous cases we find the net initial cost of windows to be $486.20. The annual cost consists of the following items; interest, $29.17; depreciation at 2.83 per cent or $13.75; repairs at 2.5 per cent or $12.15; and washing four times per year or $14.96. the total annual cost of windows is found to be $70.03.

Assuming the same heat losses per square foot the initial cost of heating system to supply the net loss is $171.60. The annual cost of supplying the heat loss consists of the following items: interest, $10.30; depreciation $5.84; repairs $0.96; fuel $24.30. The total annual cost of heating system to supply the net heat loss is $41.40.

This seven-room house equipped for adequate lighting is assumed to have the following equipment. The living room contains a ceiling-fixture, one table lamp, one floor-lamp, two candle-lamps and four convenience outlets; the dining-room contains a ceiling-fixture, two wall-brackets and one convenience outlet; the kitchen contains a ceiling-fixture, a drop-cord or wall-bracket, and two convenience outlets; each of the three bed-rooms contains a ceiling-fixture, two wall-brackets, a table-lamp and two convenience outlets; the bath-room contains two wall-brackets and a convenience outlet; each of the two hallways contains a ceiling-fixture and a convenience outlet; each of the two porches contains a ceiling-fixture and a convenience outlet; and the basement contains four drop-cords and a convenience outlet.

The initial investment in this more adequately equipped seven-room house, therefore, includes the expense of fifteen ceiling outlets, ten wall-bracket outlets and 19 convenience outlets, all at $5 per outlet or a total of $220 for electric wiring; it includes $245 for fixtures; and $145 for table and floor lamps; or a total of $610 for electric wiring, fixtures and portables.

The annual cost of the artificial lighting consists of an interest charge of $36.60; depreciation of $23.65; repairs of $6.85; lamp renewals of $5.06. and the cost of 598 kw.-hr. of energy at $0.08 per kw.h. or $47.84 for electric energy. This is a total for electric lighting of $120 per annum.

The summary of costs is presented at the beginning of this section.

FIVE ROOM BRICK APARTMENT
Steam-Heated

	Natural lighting	Artifical lighting
Initial cost of installation	$225	$230
Total annual cost of lighting	39	65

It is assumed that this steam-heated five-room apartment has only one-hall the window area of the first house considered or 144 square feet and that the electric lighting is meager but representing the average condition.

Using the same assumptions and conditions as in previous cases the initial net cost of the windows is found to be $187.20 and the net annual cost of these windows to be $27.22.

The initial cost of the steam-heating system is assumed to be $1.40 per square foot of radiation. The annual cost per square foot of radiation is computed to be $9.146 including interest, depreciation, and repairs; and the cost of fuel is computed to be 0.28 per square foot of radiation per annum. The initial cost of the heating system to supply the net heat loss of the windows is found to be $37.80. The total annual cost to supply the heat losses due to windows is found to be $11.50.

The summary of costs chargeable to natural lighting are presented at the beginning of this section.

In this apartment there are assumed to be five ceiling-outlets, two wall-brackets, and five convenience outlets which at $7.50 per outlet represent an initial cost of $90.00 for wiring.

An allowance of $85 is made for fixtures and $55 for brackets making a total initial cost of $230.00.

The annual cost consists of the following items; interest, $13.80; depreciation, $9.13; repairs, $2.60; lamp renewals, $3.83; 443 kw.h. at $0.08 per kw.h. or $35.44 for electric energy. This totals $64.80 per year for electric lighting.

MODERN HOTEL ROOM AND BATH

	Natural lighting	Artifical lighting
Initial cost of installation	$161	$115
Total annual cost of lighting	14	14

We assume a hotel in the down-town section of Cleveland, for instance where real estate is worth $60 per square foot; we assume that the building is 14 stories high; that 13 per cent of the possible floor space is sacrificed for light-courts; that the building is one-storey high above ground on light-courts and covered with sky-lights over one-fourth this area. We further assume that a system of heating and ventilation is installed for washing and heating the air.

Assuming the initial cost of a high-class pressed-steel frame window is $2.50 per square foot, and the brick wall replaced is $0.75 per square foor or a net cost per square foot of $1.75, with interest at 6 per cent, depreciation at 3 per cent, repairs 0.6 per cent, and washing four times per year at $0.01 per square foot the annual cost per square foot becomes $0.208. Assuming a room and bath to have out one 4 foot x 6 foot window the initial net cost of window would be $42.00 and the annual cost of interest, depreciation, repair and washing would be $5.

Assuming an initial cost for the heating and ventilating system of $5.50 per square foot of radiation, and an interest of 6 per cent depreciation of 3.4 per cent, repairs of 0.6 per cent. and fuel at $7 per ton to operate the heating system at half capacity for seven months of the year, and electric energy for the ventilating fans at one-fourth the cost of fuel, then the annual cost of operating one square foot of radiation becomes $0.80. Since one square foot of window is computed to lose a net amount of heat of 44.8 B. t. u. per hour, one square foot of window requires 0.187 square feet of radiation. Therefore the initial cost of heating and ventilating systems required per square foot of window is $1.03; and the annual cost for heating one square foot of window is $0.15. Therefore the initial net cost of heating and ventilating system for the 24 square feet of window surface for a room and bath is $24.72; and the annual cost is $3.60.

Assuming real estate worth $60 per square foot the building 14-stories high and 13 per cent of possible floor space taken up in light-courts, the net cost of real estate per square foot of floor is $0.56. If the room and bath be assumed to contain 168 square feet of floor space, the initial cost of real estate chargeable against light-courts is $94.08, and the annual charge for interest at 6 per cent is $5.65.

The large portion of the cost of natural lighting which is due to the area occupied by light-courts makes this matter of concern. Where land-values are still higher the cost of light-courts becomes even more important.

Summarizing we obtain the costs presented at the begining of this section.

Assuming that we have one ceiling-outlet, two wall-bracket outlets and one convenience outlet in each room, and two wall bracket outlets and a convenience outlet in each bath and allowing $10 per outlet we find the initial cost of wiring to be $70. If in addition to the fixtures there is a table-lamp we assume an initial cost of fixtures and portables to amount to $45 or a total initial cost of electric wiring, fixtures and portables of $115.

The total annual charge will consist of a charge of $6.90 for interest, of $2.27 for depreciation, of $1.18 for repairs, of $0.99 for lamp renewals, and a charge for 65 kw.-hr. of electric energy at $0.04 or $2.60. These represent an annual cost of $13.94 for electric lighting for a room and bath.

A SUITE OF OFFICE ROOMS

	Natural lighting		
	without light court	with light-court	Artificial lighting
Initial cost of installation	$667	$1,584	$976
Total annual cost of lighting	86	141	290

In such a case as the hallway assumed in the suite, artifical light must be used a considerable portion of the day. This is also true of artifical light in the offices. Strictly, the costs of artificial light to reinforce the natural lighting should be charged against natural lighting. This has not been done but if it had been done the costs of artificial lighting would have been reduced and the costs of natural lighting would have been correspondingly increased.

For comparison of natural and artifical illumination we have assumed a suite of rooms in an office building consisting of six 14 feet x 16 feet offices with three offices on a side and a 7-foot hallway between. We assume further that each room is illuminated by two 4 feet x 5 feet windows and by four 200-watt semi-indirect ceiling-fixtures, and that the air for ventilation is washed and heated before being circulated.

Assuming a net initial cost per square foot of window to be $1.75 and its annual cost to be $0.208, we find the initial net cost for windows in the whole suite to be $420; and the annual cost to be $49.92.

The heating system necessary to supply the heat losses due to windows assume as in the hotel, to have an initial net cost per square foot of window of $1.03; and the annual cost to be $0.15; therefore, the initial cost of heating system to supply the net loss of heat through windows is $247.20 and the annual cost is $36.

Summarizing we find the costs as presented at the beginning of this section.

Assuming four semi-indirect ceiling-fixtures and three convenience outlets in each office and one direct ceiling-fixture in the hall, we have at $10 per outlet, a total initial cost of $430 for electric wiring. Assuming, $22.50 for each office fixture and $6 for the hall fixture we obtain a total initial cast of $546 for fixtures or a total initial cost of wiring and fixtures of $976.

The annual cost of electric lighting according to the assumptions and computations consists of $58.56 for interest, of $21.84 for depreciation, of $9.76 for repairs, of $36.90 for lamp renewals, and of the cost of 4,080 kw.-hr. at $0.04 or $163.20 for electric energy. These represent a total annual cost for a suite of six rooms and hall of $290.26 for artificial lighting.

If we assume, as in the case of the hotel that there be an initial cost of $0.56 per square foot of floor area for light-courts, the initial cost of natural lighting would be increased by $917.28 and would become $1,584.48; and the annual cost of natural lighting would become $140.96.

CONCLUSION

It is the aim of this paper to present cost-data pertaining to natural and artificial (electric) lighting systems for a few representative interiors. In making these computations actual buildings have been used as a basis in each case although in some cases certain minor modifications were made which, in our judgment, made them more generally representative of their class. In the interest of space conservation a vast number of details of computation and estimates have been omitted in the preparation of this paper; however, the chief assumptions and estimates are presented. It should be recognized that conditions upon which costs are based vary considerably but having chosen actual buildings it is thought that the costs presented in the foregoing paragraphs are at least approximate.

It is seen that the cost of natural lighting is of the same order of magnitude as that of artificial electric lighting in all cases.

It is not suggested that we eliminate windows from residences but it is felt that cognizance of the fact that daylight costs are appreciable in residences should make the householder more lenient towards the costs of adequate and proper artificial lighting.

In the case of office buildings, hotels, museums, and other public buildings, especially in congested districts where land-values are excessive, it is seriously suggested that the cost of natural lighting be given greater consideration in general than in the past. Light-courts in many cases contribute a large burden of cost to natural lighting and in many of our offices and hotel rooms they do not provide adequate natural lighting. In other words during many hours of a year artificial lighting must reinforce natural lighting even in the daytime. But in the foregoing sections this has not been charged to natural lighting, but has been borne by artificial lighting.

In many cases windows also contribute much to the cost of natural lighting by utilizing valuable space.

The psychological effect of the absence of windows is well recognized but in our congested cities many persons must work under inadequate, or total absence of daylight. Many night-workers gain little or no advantage from windows excepting the psychological effect of "natural" ventilation. If congestion increases, economic consideration will surely compel the reduction of area of light-courts and of windows and will perhaps eliminate them entirely in some cases.

Artificial ventilation and adequate artificial lighting can supply the actual utilitarian demands. It is easy to prove that many interiors existing to-day would be improved as work-places if the outlay for daylight could be applied to the rehabilitation of the artificial lighting.

In some cases, such as museums, there appear to be no defensible reasons for not eliminating the cost of daylight in some of the rooms while the building is being constructed. Adequate and proper means of artificial lighting can be installed, operated, and maintained at costs comparable with and in some cases even less than adequate natural lighting systems. This plan applies particularly to spaces in the central portion of large buildings, and substitutes for more or less undependable natural lighting, readily controlled modern artificial lighting.

The questions involved in substituting artificial lighting for natural lighting are numerous and complex and a discussion of them would lead us far from the objective of this paper. Some of them have been briefly touched upon to show why we set ourselves to the task of estimating the cost of daylight.

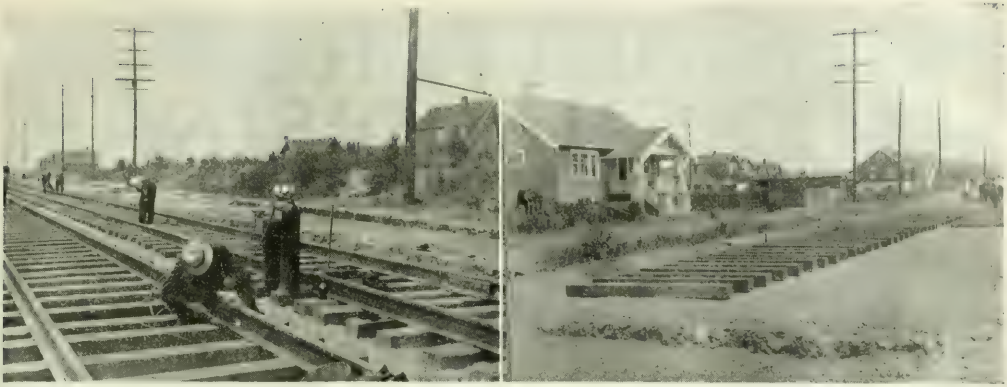
Direct wireless communication from England to Australia will be possible in the near future. Plans to this end are already so far advanced that a site for the large station required for the purpose has been inspected. The proposed station will probably be situated at Bourne, in Lincolnshire, England, and will, it is said, be equipped with aerials a mile in length and half a mile in breadth. The total cost of the station will be over a million sterling.

Mr. Wolsey Accepts Important Office

Mr. R. B. Wolsey has been appointed registrar and secretary-treasurer of the Association of Professional Engineers of the province of Ontario. Mr. Wolsey is an engineer, of varied experience. He received his education and training in English schools, and, later with Mr. Martin, an eminent engineer and architect of Westminster. He came to Toronto 31 years ago and has been associated with a number of engineering firms. Since 1913 Mr. Wolsey has been secretary and acting registrar of the Ontario Association of Architects. He is also an invaluable member of the Engineers Club, where everybody knows and likes him.

Mr. R. B. Wolsey

Canadians who qualified for Hoover "Go-Getter" Convention: Back row left to right, William Crawford, dist. mgr., Winnipeg; J. B. Fleming, dist. mgr., Halifax; S. A. Small, dist. mgr., Ottawa: J. F. Paxton, dist. mgr., Toronto; P. T. Brinsmead, dist. mgr., Regina. Front row, left to right, H. M. Potticary, dist. mgr., Montreal; W. D. Booker, dist. mgr., Hamilton; W. G. Vogt, office mgr., Hamilton; Thomas F. Kelly, div. mgr., Hamilton; R. F. Judisch, prod. mgr., Hamilton, G. T. White, dist. mgr. London, Ont.



Left—Bonding rails by welding. Right—6 x 8 fir ties laid on subgrade of crushed stone chips.

Trackage Extensions on the B.C.E.R. Co's Lines

With the completion of work on the double track on Broadway West, Vancouver, the British Columbia Electric Railway Company, has put into service an extension that is abundantly justified by the fast growing district for which it is provided.

The type of construction adopted was first class, designed to give service for many years to come. The rails used were 8 in. heavy type, designed for use with permanent pavements. The method of bonding was carefully considered, and it was decided that the best interests of economy and efficiency were served by using solid copper bonds, in place of the cable which was formerly the standard. The oxy-acetylene process was employed for the welding, which is well illustrated by the accompanying photograph.

Fir ties were used throughout, of a uniform size of 6 by 8 inches. One of the accompanying photographs illustrates the method of laying these upon a subgrade of crushed stone chips.

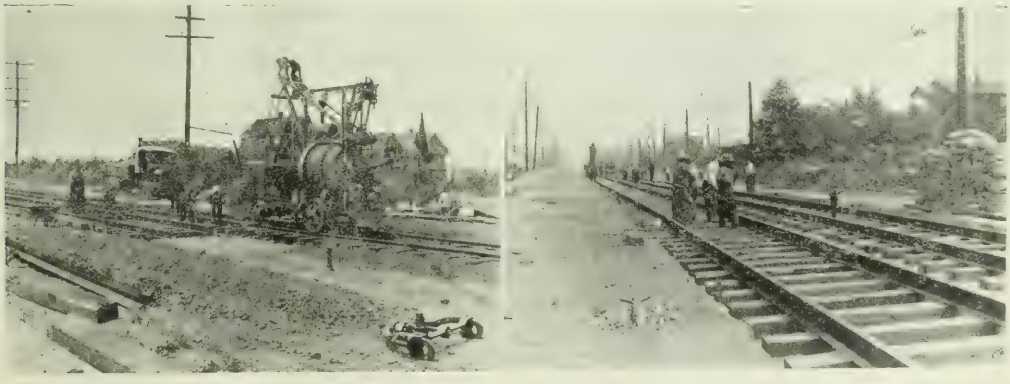
A ballast foundation has been used, the consideration being that this method of construction gives maximum flexibility with sufficient rigidity. It is to be noted that this method of construction has won general favor with the larger street railway companies—all intersections of the Toronto Transportation Commission are laid upon this type of foundation.

The fir ties rest upon 9 inches of ballast, commencing with 3 inch stone, and finished with about 3 inches of screenings. The same fine material was used for tamping, after which a course of concrete was run in.

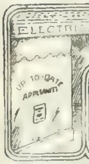
This extension cost in the neighborhood of $75,000, and most of the money was spent in local labor and materials. The cars started running to Alma Road on Broadway West, on Sept. 1st, thus fulfilling a promise made to the city council three months ago. At the present time a 10 minute service is being given, and a close check is being kept on traffic so that the needs of the district will be adequately taken care of.

The management state that the service is only experimental at the present time and that the present arrangements may be subject to change according to the traffic.

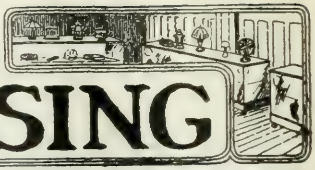
Plans for further extensions are being considered with a view to providing direct service for residents of Dunbar Heights. It is stated the company's plans include the extending of the service by way of Dunbar and Sasamat, alternate cars taking these routes and thus giving a 20 minute direct service to the city. In that case both the Sasamat and the Dunbar cars would operate through to the city via Broadway West. It is stated that the management are also anxious to improve the service to West Kitsilano and West Point Grey, as the present routing is not of the best.



Left—Concrete mixing plant, dump bucket with radial arm. Right—Tamping track with crushed chips; concreting plant in rear



BETTER MERCHANDISING



Is This Your $100 ?

Have you any original ideas about a programme for the coming November Convention?

One well-known contractor-dealer makes the following suggestion:

"Let's get away from papers and speeches. Give us some Demonstrations of Salesmanship. I suggest we hold a series of salesmanship competitions—give hundred dollar prizes—appoint competent judges—so that competitors will take the trouble to prepare their parts and rehearse them properly.

"We've been told often enough what to do Let us hear now—"How-To-Do-It."

If this suggestion appeals to you, **drop the editor a line by return** and we'll see that it gets to the Programme Committee promptly. Add any other suggestions that occur to you.

Supplementing the Coal Shortage Electric Heat to the Rescue!

An Electric Heater in Every Home

The Present Month of October is the Finest Opportunity the Electrical Industry Could Have to Demonstrate its Practical Value in the Home. The Sale of Heaters Means Added Business in the way of Wiring and the later Sale of Many other Appliances

Now or never!

There never was such an opportunity for business as is offered the electrical contractor and dealer during this month of October by the coal shortage.

There is no coal in most cellars.

There will only be 60 per cent. of our regular supply available under the most favorable circumstances.

Don't think this means that people will come to the contractor and the dealer and demand service. Some householders will do this, but many more will need convincing. Besides, electricity will have competitors. There is apparently no shortage of soft coal; there is some coke also; some briquettes; there are coal-oil burners; gas burners and crude oil furnaces. All of these will have sales advocates. And then there is the need for early action. If the houses are not properly wired the heaters are useless—and wiring will take time.

The central stations also must arrange to take care of much of the increased load. Thus it seems that the harvest is ripe to-day—over-ripe indeed.

Many of our contractor-dealers are already on the warpath. They say the game is plentiful, that the houewives are ready to be convinced and their husbands very willing to do anything that will relieve the situation. Here is the way one of our dealers went about it:

An Actual Experience

He first acquainted himself with the actual facts regarding the coal situation. Calling up several dealers he received their assurance that they had "not a pound" in stock —that they had no knowledge when they would have any.

Then he got out his list of prospects.

He knew, in a general way, what the wiring in these houses was like and what appliances they owned. Some of them had one small heater. A number of them had two. A few of them had electric grates. The wiring in most cases was the bugbear—wouldn't carry much of a heating load. So he prepared the following letter to the lady of the house:

Dear Madam:—

Have you got your winter's supply of coal tucked away in your cellar?

If you have, please accept our congratulations.

If you have not, I want you to give me just five minutes of your time to-morrow or Friday to see if we cannot suggest some plan of helping you out with electric heat. No doubt you have thought about it and may have some questions to ask. I shall be glad to answer them.

May I telephone you about it, before I set out?

Yours truly,
John Smith.

These letters went out on Tuesday night, were received on Wednesday morning, digested the during the day and discussed with hubby in the evening. This, at least was the way our dealer figured it would work out and after-results showed that he was about right.

Thursday morning at nine o'clock he sat down to his telephone. The first name on his list was Mrs. J. B. Jones, Tel. S. 368. He called this number and when Mrs. Jones came to the telephone, this is what he said:

"This is John Smith, the electrical dealer on James Street, I took the liberty of writing you about electric heating in your home. If it is quite convenient to you I could call at your house in a few minutes and answer any questions."

And Mrs. Jones replies:

"Yes, I got your letter and talked it over with Mr. Jones last night. He thinks electric heat would be too expensive and besides, he said he thought you would need to do some extra wiring. I hardly think it would be worth your trouble coming up."

To which our friend counters:

"Well, its just this way Mrs. Jones. Electric heating may cost a very little more, but not much, and a great many homes I know of have no coal at all and they are glad to know about electric heating. Many of my customers plan to use electric heaters through the month of October and part of November and even then there may be no coal, or not enough to go around. Perhaps you think it would be more expensive than it really is, and that would be one of the things we could talk about. We can take one of your rooms, for instance, and I can tell you the exact cost of heating it."

In the end Mrs. Jones consents to see him at 10:30 o'clock.

And so it went, down the list. About 50 per cent. of the telephone calls ended the same way. Thus between telephoning and keeping his appointments he was soon as busy as could be. He would make appointments with only four or five in advance and he tried to have them in the same district.

But to follow John Smith on his campaign:

At 10:30 he presented himself at Mrs. Jones house. "I was well dressed and a half decent looking chap" he states modestly "and so I walked confidently to the front door." His conversation with Mrs. Jones, as near as we recall his story of it, was like this:

"Good morning Mrs. Jones. I am John Smith, the electrical dealer who telephoned you about electric heating."

"Good morning Mr. Smith. I hope I have not brought you here on a wild goose chase, for I really don't expect we can do anything, and you would have to see my husband, of course, but the truth is we are really worried about having no fuel. Here it is getting along to October and the evenings are already cold and damp and that cold snap we had last week brought the situation home to us very vividly. You said that electric heating is not so very expensive? Could we heat our whole house? What would it cost? Do we have to buy heaters? I am afraid I know very little about such things."

"I'll answer one of your questions promptly Mrs. Jones" replied our friend. "You cannot hope to heat your whole house in real cold weather. What I can promise you, however, is that you can keep it very comfortable for a month or six weeks until coal arrives in town. Most of us will likely have to be satisfied this winter with keeping only those rooms comfortable that we are actually living in. Electric heating will do this nicely. Even when coal was available last year a number of homes I know of used nothing but electric heaters up to November 1st, or later. You know how dirty the furnace is at any time and how difficult it is to keep the house just the right temperature when it is not very cold outside. The electric heaters handle that situation splendidly. You heat just the room you want and you can shut it off in an instant when the room gets warm enough or when you move to another room. It is partly on account of these savings that we can promise that you will not find electric heating expensive."

"Oh yes" chimed in Mrs. Jones "what would the use of a heater likely cost us? Suppose we wanted to keep this room we are in now comfortable enough to sit in during a cold evening?"

John Smith makes a hasty estimate of the air volume of the room. It is about twenty feet long, fourteen feet wide and 8 ft. 6 in. high—2,400 cubic feet roughly. He figures that a half a watt per cubic foot will keep this room comfortable up to the real cold weather. i.e. 1,200 watts. At two cents per kilowatt-hour this amounts to 2.4 cents per hour. So he explains to Mrs. Jones:

"It would probably not cost you any more than two and a half cents to heat this room up nicely. Then you could either turn the heater off or keep it on as long as you liked. You would likely never need to use it longer than two hours of an evening. The total cost would then only be five cents."

"Five cents" echoed Mrs. Jones "five cents to keep this room comfortable all evening, surely that is a mistake."

"No, Mrs. Jones, I can promise you that will be ample."

"Well that is very much less than I expected. And my husband will be very much surprised too. We should have to buy a heater, shouldn't we?"

"Yes, but that too is probably less expensive than you expect. If you want a nice mantle type they run into more money naturally as they make a very attractive decoration. Nothing is cosier than a warm glow in the fire place, but there are other types, quite as efficient. I could show you a heater to do what I spoke of just now for blank dollars. Mantle type heaters cost all the way up to blank dollars. Would it be too much trouble for you to drop into my store sometime during to-day and see the different types."

Arrangements are finally made for a store appointment as Mr. Jones is on his way from the office in the evening, Mrs. Jones being anxious that her husband should be present in making the inspection.

"Now I want you to notice" said our friend the dealer in speaking of this incident to the writer "that Mrs. Jones has not been asked to commit herself definitely to buying a heater. I have just taken that for granted and in the end so does she. Many sales are lost by a premature attempt to get a definite committal, to get the name on the dotted line, so to speak, when much better results could be obtained by assuming your customer's consent.

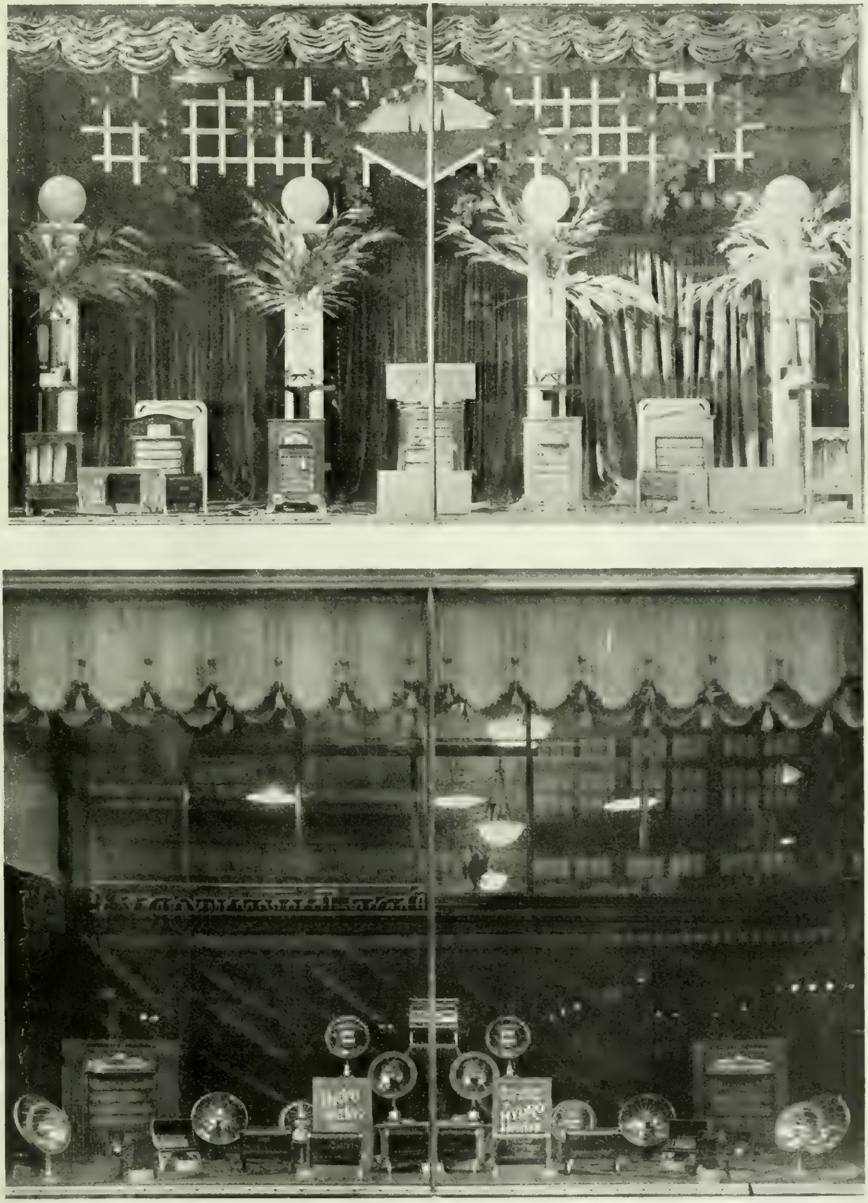
I TAKE YOUR WORD FOR IT WRAP IT UP I'VE GOT TO QUIT SHIVERING MYSELF BLUE EVERY TIME I GO TO BATHE
I RECOMMEND THIS HEATER BECAUSE ALL MY CUSTOMERS SAY THAT IT IS A REAL HEAT PRODUCER—
WHEN I THINK HOW FOOLISH I'VE BEEN ALL THIS WHILE FOR NOT INVESTING IN THIS —
S-S-SURE YOU CAN ITS ONLY ONE OF THESE —
NOT SO FAST - I JUST WANT TO TAKE A LITTLE LOOK AT THAT BUNDLE
ELECTRIC HEATERS THAT KEEP YOU WARM THESE DAYS
HAW HAW! EXCUSE ME. I THOUGHT IT WAS ANOTHER SORT OF WARMER AND THEN I WOULD HAVE WARMED YOU PLENTY
HURRAH! HERE'S WHERE WE BEAT THE COAL MAN WITH AN ELECTRIC HEATER
PA A! IS THAT MY RADIO SET'
IF IT'S AS GOOD AS MY ELECTRIC IRON, I'LL SAY O K
FOR GOODNESS SAKE GEORGE WILL YOU STAY THERE ALL NIGHT
PA-A A' HURRY UP I WANTS A BATH TOO
TAKE YOUR TIME THIS IS THE FIRST SOLID COMFORT POP HAS HAD FOR A LONG WHILE. SOME HEATER

That grand and glorious feeling

"Another thing I want you to notice" continued this dealer "is that I had not said a single word about wiring the house yet. That was carefully planned on my part. As it happened in this case Mrs. Jones had not raised the question, but if she had I should have sidetracked it as soon as possible. My aim was to get Mr. & Mrs. Jones to the point where they visualized a nice cosy electric heater in their living room, with the temperature just right, Mr. Jones in his easy chair over his pipe and his evening paper and so on. He was not interested in electric heaters as such or in electric wiring. He and Mrs. Jones wanted warmth, color and comfort and that is what I bent my efforts towards selling them."

Mr. & Mrs. Jones selected their heater—two of them in

Are Your Windows on Your Sales Staff?



Window Displays That Put the Message Across fact, a mantle type and a cheaper one. "They were becoming quite enthusiastic said Smith "and Mr. Jones asked if I could send them up right away."

The crucial moment had come.

"I am not just certain about the wiring in your home Mr. Jones," began Smith "When I was up there this morning the thought occurred to me that it may be necessary to put in larger wires in one or two places. You get rather better results from your heater and you know, of course, that if you overload an electric circuit the fuse blows out and has to be replaced. I don't think I could let you have electric heat to-night but perhaps by Saturday night it could be arranged. How would it be if I bring up the heaters to-night and look over your wiring?"

"Thus" said our dealer "step by step I led them along. I knew from the first that this house would have to be practically rewired but I did not think it wise to tell them so. However, the whole thing came out in the evening when I delivered the heaters. We put the mantle heater in place and it just looked "great," Mr. Jones said. I felt then that it was safe to take up the matter of rewiring."

"This is not an exceptional case" said this dealer "it is merely typical. It takes time, of course, but I get paid for my time. By going about the matter systematically and diplomatically Mr. Jones was finally brought to see the necessity for entirely new wiring. I was able to show him that this would cost very little more than a make shift job as in any case it was necessary to put in a larger stand pipe and heavier service. Consequently he may as well make arrangements for using an electric range and water heater."

"The proof of the pudding is in the eating," concluded Brown. "We have already finished wiring the house and they are using both their heaters and getting more pleased with them all the time. In a few days—after the end of the month as a matter of fact, for Mr. Jones is a salaried man—they are coming in to see a range and I have no doubt I shall sell them one. They already have a toaster, vacuum cleaner and one or two other things, and my next effort will be a washing machine and then an ironer or a water heater. I have figured this thing out very carefully and shall be much disappointed if I don't do business with the Jones family, before the year is out, to the extent of five or six hundred dollars. The wiring came to almost two hundred."

"How many such prospects as the Jones' have you on your list, friend Smith?" ventured the writer.

"We have four hundred good prospects in mind," said Smith, "not all as good as Jones, though fifty to a hundred of them ought to be. I am going to do fifty thousand dollars turnover this year—twice what I did last year—and the coal situation has made it all possible. I may have a cold house myself this winter but it will be some satisfaction to have a warm bank account."

The Electrical Dealer Has Plenty of Effective Ammunition

There are still a few people who dream of the day when Niagara Falls and similar sources of energy shall be fully developed and the necessity for importing coal for heating our homes shall be done away with. Once and for all this dream should be answered.

Let us make a simple calculation. Toronto has a population roughly of 600,000 people. Counting four people to a home there are 150,000 homes. Counting the average air volume per house as 10,000 cubic feet we have in all 1,500,000,000 cubic feet.

The next question is, to determine what amount of electric energy is necessary per cubic foot.

Sometime ago the Electrical News published figures of an actual heating installation at Seven Falls, Quebec, where the temperature outside went as low as Zero, and as high as 55 degrees, during the month of March. The temperature within doors during this period never went lower than 58 degrees, and the highest amount of energy used never exceeded 1.52 watts per cubic foot of air space. That is, during one of the coldest months' of a Canadian winter, the temperature of a house was kept above 58 degrees, invariably (on only 5 days was it below 65 degrees) with a maximum capacity of 1.5 kilowatts per cubic foot. This same installation during February has used 1.75 watts per cubic foot, and the conclusion drawn from these figures is that two watts per cubic foot would take care of all weather requirements.

Now going back to our estimate of space to be heated in the City of Toronto, we have 1,500,000,000 cubic feet. At two watts per cubic foot this means a demand on the coldest days of three billion watts, (3,000,000,000) or three million kilowatts, (3,000,000).

The Power of Niagara

It has been variously estimated that if all the water in Niagara River could be utilized at the total head between the two lakes, we should be able to develop about five million horsepower, (5,000,000, h.p.) To date there is only something like one million horsepower available. Supposing, therefore, that all the power now being developed at Niagara Falls, both on the Canadian and United States sides, was withdrawn from present use, and concentrated on heating homes of Toronto citizens, there would be not more than half enough to go round when the cold weather came.

This is unfortunate, but it is a fact. It is no reason, however, why we should not use Niagara power when we can get it. When all our industries are satisfied, and there is a surplus over, there is no earthly reason why we should not use it to make ourselves comfortable. At the present time Ontario is happily situated, in that Chippawa provides a considerable surplus for industrial requirements of the moment. By Christmas this surplus will very likely amount to 100,000 kilowatts. In a recent issue we estimated that the Ontario Commission could probably take care of 150,000 one kilowatt heaters, when they get their fifth generator in operation.

One Heater to Every Four Homes

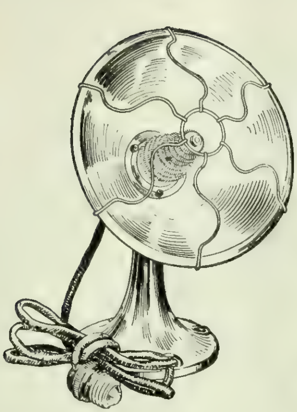
150,000 heaters may seem quite a number to sell during the month of October, but it only means one in ever home in Toronto, or one in every four homes in Ontario.

We have merely taken the Niagara case as an example, because at the moment there is a large amount of surplus power in prospect. The same thing is true in a number of power centres at other points, but not, of course, to the same extent. It is evident, therefore, that at many points in Canada there is much work for the electrical men during the month of October.

One-half Kilowatt per Cubic Foot

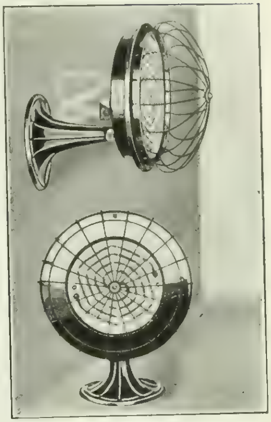
The figures given above with respect to consumption, apply, of course, to exceedingly cold weather. Such large capacities would not be necessary during the months of October and November. Indeed, it would probably be per-

DEFYING THE COAL SHORTAGE



The Great West Elec. Co.; ready for the Prairie blizzard

The National Heatray; the unit screws in and out just like a lamp bulb



Heavy Duty Hotpoint; 1000, 1500 and 2000 watts capacity

An attractive 'National' mantel type

The Hotpoint Hedlite—Can. Gen. Elec. Co.

Gilbert-Menzies Polar Cub; a popular priced heater

The Equator Mfg. Co's concentrating type heater

The Cosy Glow—Can. Westinghouse Co.

fectly safe to guarantee that our houses could be kept comfortable on consumption of one-half watt per cubic foot. If people will school themselves in patience, smaller capacities than this will be sufficient. Whatever the reason is, however, the average householder expects to get immediate results from his electric heater, and if after about five minutes he is not in perspiration he is apt to condemn it as "slow." It might be a good idea to point out to such people that it is generally four or five hours after the hot water furnace is started up before the house is comfortably warm, ant it is unreasonable to expect instantaneous results from electric heat, though it might also be pointed out that they are much quicker with an electric heater than with any type of furnace.

More Heaters of Smaller Capacity

We want to suggest, therefore, to contractors, that they endeavor to sell and install more heaters of a smaller capacity. We suggest for instance that it would be better to sell three 1,000 kw. heaters in the same home than one unit of 3,000 kw. or even two 1,500. We may even go farther and argue that five units of 600 kw. would serve the purpose of the householder better. There are many reasons why we advance this argument. To begin with, the larger number of small units will provide a better load factor on the central station lines. Even if the larger units are provided with a 3-capacity switch, experience shows that they are operated almost entirely at the higher capacity. Then, with the smaller units the load is more evenly distributed throughout the house, and the wiring is not subjected to such heavy demand at isolated points. From the consumer's point of view it means that he can keep two or three rooms reasonably comfortably, instead of all the family huddling in one room, which is likely to become uncomfortably warm and badly ventilated. The selfish view point is that a large number of heaters will net the dealer and manufacturer a little more profit. From the central station view point a small heater is more satisfactory, because the tendency is to operate one unit for a longer period rather than a larger unit for a shorter period.

As Auxiliary Heat

The dealer should also make much of the argument that electric heat is ideal for supplementing other heat supply during particularly cold weather. Any householder knows that his furnace is a size or two larger than he needs, except for about two or three days in the coldest winter weather. He is forced to make the added expenditure as an insurance of comfort and safety during these peaks. It should be pointed out to the man who is building a home or installing a new furnace that electric heat will supplement his furnace and take care of his surplus demand at a lower cost than would be involved in putting in an unduly large furnace and operating it at low capacity throughout the whole winter. In a word, electric heat enables one to install a furnace in his home of the most economic capacity and operate it at its most economic rating, throughout the whole winter.

And then the Wiring Jobs

How often do we hear it said that, electric heaters are easy enough to sell and electric ranges are easy enough to sell, but the homes are not properly wired for them; right here then, seems to be the opportunity the contractor has been waiting for. In the past the householder was in a position to say, "no, I won't buy a heater, because the wiring for it would cost me too much." Today, however, he is in this position where he says, "I have got to have a heater, so I suppose there is no way out of it; come down and wire my house for electric heating just as quick as you can." It looks like the most wonderful opportunity the electrical contractor has ever had, and we trust he is preparing to take the fullest advantage of the opportunity.

The Contractor-Dealer

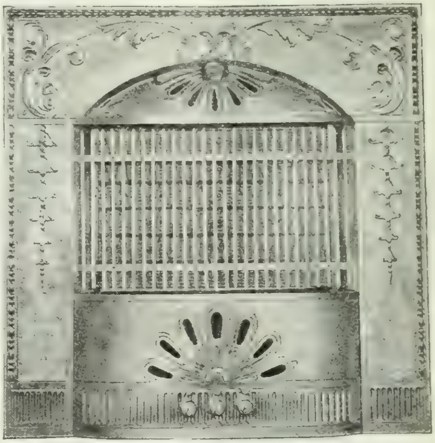
It does sometimes seem, as if everybody likes to take a crack at the contractor-dealer, and say how slow he is and how badly he manages his business and what a poor merchandiser he is, and lots of other hard things, but we believe he is going to rise to his opportunities this time. Manufacturers are backing him up and turning out heaters and auxiliary equipment at a greatly increased rate. Just at the moment we hear of a demand which exceeds the supply, but that is largely due to the fact that demand held-off a little too long and has caught manufacturers with too limited capacity. This capacity is being increased, however, very rapidly, and we believe the dealers and contractors may rest assured that they may go ahead with there best efforts, and that the manufacturers will be able to make delivery both of materials and heaters, practically as required.

The results of these campaigns are going to be far reaching. The rewiring of a home if it is properly done, will mean much more than the sale of a heater or two. Next will come the range, then a water-heater, ironing machine and so on. In addition, the moral effect will be favorable if the electrical industry helps people out in a tight pinch. They will feel kindly towards it, and will be much more easily induced to buy the numerous labor saving devices. We should do as much as possible during this campaign to make householders enthusiastic for the electrical method of doing everything about the home.

Wiring Scottish Rite Cathebral

Messrs. Culley & Breay, electrical contractors, have been awarded the contract for the wiring in the Scottish Rite Cathedral, Hamilton, which will be one of the finest Masonic temples in Canada. Messrs. Culley & Breay are installing a quite elaborate electrical system, including a stage switchboard with dimmers, etc., border lights, prescenium strip lights, etc. There will be fourty-three switches on the stage switch-board with four master switches; also a bank of dimmers for dimming the colored lights, which will be installed throughout the building.

Saskatoon, Sask.



A "National" Mantel type heater

Putting "Pep" Into Your Heater Sales and Money Into Your Bank Account

A Large Percentage of Wired Homes do Not Own Electric Heaters—Some Hints for the Merchant

Of the thousands of homes that are wired for electricity, only a small percentage have electric heaters—5 per cent is a conservative estimate. With the present coal shortage, the remaining 95 per cent are fine prospetcs for heater sales, and right now is the time to go after them. Any electrical dealer can initiate a heater campaign with confidence, at the present time, and he will find that they will move with the minimum of sales effort.

Heaters can be retailed at prices within the reach of the average salaried man—in fact, every man that lives in a wired home is a prospect. Mr. Common Person does not have to mortgage his home, or tie himself up to an installment plan that looks like a life annuity scheme—he has just to hand over a fraction of his month's salary and the complete supplementary heating unit is his.

The smaller units are going to be sold in the greater numbers but at the same time they should not crowd from the dealer's mind the higher wattage heaters and the electric grates.

If Mr. Well-fixed ever had an idea that he would like an electric grate in every bedroom in his house, now is the time he is likely to feel most willing to put the idea into execution, and his neighbor will probably emulate him, by putting in a service that will take care of any heating or cooking load he wants to put on it.

These people are not going to part with their money till they are asked for it, however, a certain amount of push has to be used, and a heater campaign should begin with the advertising.

Advertising

Electric heater sales talk and advertising should not deal to any extent with the mechanical features of the device. The metals used in construction, the wire used in the element, the method of finishing,—these things are not the best selling points—they are interesting to a percentage of your customers that are educated on electric heaters, but these are a very small fraction of the whole. What counts are facts that have a wide general appeal, that attract people who don't know whether an electric heater is assembled or cast all in one piece, and don't particularly care. These are the great majority of buyers and effective selling talk must cater to them. It is best to talk of the advantages of the electric heater generally its portability, ease of operation, the possibility of having the heat exactly where desired, and so on.

Here is an appealing bit of copy:

Glowing Heat—Where You Want It

"Either to cheer the worker who must start to his task in the cold grey dawn. or to comfort the kiddies at their bed-time hour, the electric heater is supreme—an abundance of glowing heat with the turn of a button.

"Moveable anywhere, always ready for instant use, this handsome heater will have a thousand uses in any family. It is easy to keep smart and clean, and the polished reflector puts the heat where you want it.

"The worry of running furnace fires in mild weather is eliminated—no tinkering with grates and coal—and the heat is just where you want it, not all over the house. Think of the economy!"

That is the sort of ad. that gets across to the man who hates getting up on cold mornings and to the woman who is worrying about the difficulty and dirt in operating furnaces in mild weather.

Window Trim

When putting heaters in a window remember that the idea is to display them—to bring out the points that you would emphasize most if you were talking to the customer. The most effective window display is that which exhibits a single idea—the single idea is more easily assimilated by the passerby, and is better retained in his memory.

A window containing a great number of articles has not a striking effect, as generally the articles have no relation to each other, and with such a window customers may pass by, perhaps just after a change has been made, without noticing it.

Undoubtedly the thing to do is to concentrate on one idea. The window dresser should have special aptitude for his work, and be allowed time to fix up the window in decent style. Considerable time and money are well spent when it is estimated that from 30 to 50 per cent of store sales are made from the side walk through the medium of good window displays.

Here are some other window points:

(1) Use high, opaque window background to keep the view only for those outside.

(2) A window floor sticks up prominently; keep it clean.

(3) Keep the windows lighted at night.

(4) Use showcards of the right kind, with the right talk.

The Mailing List

You can't be sure that your prospects are all going to pass your window when the electric heaters are in it, nor that they will read the newspapers the day your local ad. appears therein. But you can get them with a letter—outline the idea of your sales campaign in plain, understandable English and see that you reach everybody on your mailing list. The letter must interest the women, of course. and for that reason its main point must be what the heater does for the housewife.

Personal Calls

The circular letter should be followed by a salesman to close matters and it should be emphasized right here that this is the clinching point in the campaign. The advertising, the window display and the circular letter are but the preliminaries, and they are liable to fail utterly without the follow-up of personal contact.

What Can be Accomplished

A dealer **should** sell every one of his regular customers who does not at the present time own a heater. He **can** sell every wired home in his vicinity with a little extra push. That 95 per cent is a great field to work on, and it will yield a fine harvest to any dealer who cultivates it intelligently.

Exhibitors at First Radio Convention

A "Get-Together" of Wireless Enthusiasts That Indicated Wide Extent of the Field in Canada

Canada's first radio convention and exhibition was held in the Prince George Hotel, Toronto, on September 8 and 9. A number of booths were established in the banquet hall of the hotel and hundreds of visitors saw the displays and attended the lectures which formed part of the convention programme.

The convention was arranged under the auspices of the Wireless Association of Ontario, and managed by A. H. K. Russel, president of that body. A joint session was arranged with the Ontario division of the Americal Radio Relay League.

The programme of the convention was as follows:—

Friday, September 8th

Morning Enrollment of Delegates.

2.30 to 5.00 p.m.—Opening of Convention and Address of Welcome to Delegates.

Joint Session of A.R.R.L. (Ontario Division), and W. A. of O.

7.45 p.m.—Dr. Cartmel, Northern Electric Co., on "Vacuum Tubes, Their Operation and Construction."

Mr. Campbell demonstrated new Northern Electric Receiver and Loud Speaker.

9.15 p.m.—J. H. Thompson, Chief Engineer Marconi Co., "Long Distance Communications."

Saturday, September 9th.

2.30 p.m.—Dr. Chas. A. Culver, Canadian Independent Telephone Co., on "Reception Systems for Radio," demonstrated with working models.

4.15 p.m.—K. B. Warner, on "A.R.R.L. and Its Aims and Aspirations in Relation to Canada."

7.00 p.m.—Banquet.

The latest types of equipment were on view and the exhibition hall was crowded with curious fans. The booths were arranged as below:—

Radio Devices Ltd.—The feature of this exhibit was an aluminum panel, two stage set, for which no body capacity was claimed.

Radio Manufacturers & Distributors Ltd.—A special showing of a 3,000 ohm Dictograph headset was made. Complete sets and parts were also exhibited.

Powley & Moody.—Condensers, head phones, receiving tubes and many parts attracted attention. Products of the Mullard Radiovalve Co., were a feature.

Canadian National Carbon Co.—A pleasing orange and black color scheme was worked out in this booth, which displayed the Eveready Radio Battery.

Perkins Electric Co.—Special attention was directed to Amrad radio products. Several complete sets were shown.

Dominion Battery Co.—This booth was shared by the Toronto Radio Co., theDominion Battery Co., and the Vimy Supply Co. Parts and sets were well displayed including "Reliable" batteries.

Jack V. Elliott Co.—The shining horn of the J. V. E. loud speaker was a feature of this exhibit which comprised a complete showing of receiving equipment.

A. H. Winter-Joyner—A substantial looking display of quality apparatus; Weston instruments and the Bristol Audiophone were featured.

Century Telephone Construction Co.—A fine showing was made of Federal Radio apparatus including parts and amplifier units. Mr. A. H. Dyson superintended the booth.

Chas. A. Branston Co.—The Armstrong Super Regenerative Circuit was embodied in a set that drew much attention to this display.

Salisbury Electric Co.—A display was made of Westinghouse R. C. sets which are being distributed by this company. Fall deliveries are promised.

Canadian Wireless Telephone Co.—A very small portable set, manufactured by the National Airphone corporation, drew much attention.

Marconi Co.—Receiving and transmitting sets of substantial character made up a very interesting display.

Burgess Battery Company.—Mr. G. S. Whitaker had a busy time answering enquiries concerning the full line of radio batteries shown.

Vawter-Luckett, Ltd., Toronto.—Featured Lefax Radio Service; fans seemed much interested in this handbook.

Diamond State Fibre Co.—This exhibit was located in a nicely decorated booth and comprised condenser bases, socket bases, rheostat bases, detector bases, washers, insulators, special shapes, dials, knobs, panels, tubing and other radio fibre products.

John Millen & Sons.—Pacent Radio Essentials, Atwater-Kent variocoupler and variometers, Canadian Independent Telephone apparatus and other equipment formed an interesting display.

Canadian Electrical Equipment Co.—Valley equipment formed the basis of this display, and the rectifiers and battery charges interested many.

Canadian Independent Telephone Co.—Well designed apparatus was shown here. A wavemetre formed an interesting feature, and the whole display gave an impression of substantial design and accurate workmanship.

Radio Equipment & Supplies.—Mr. Murray had a busy time explaining the functioning of a set which included two stages of radio and two stages of audio frequency. Loop aerial and peanut tubes were interesting features.

Northern Electric Company.—The Northern Electric Company had a large display room and a very fine showing of complete appartus and parts. A feature of the display was the demonstration of a complete receiving set on which exceptionally clear reception was obtained. The hook-up comprised two stages of radio frequency amplification and one stage of audio.

Licensed Broadcasting Stations in Canada

Station.	Call Signal.	Wave-length.	Range.	Power; anode input in watts.
Nova Scotia				
Halifax:—				
Marconi Wireless Tel. Co.	CFCE	440	150	500
Eastern T. & T. Co.	CJCS	410	150	1,500
New Brunswick				
St. John:—				
McLean Holt & Co.	CJCI	400	75	100
Jones Electric Radio Co.	CKCR	400	50	10
Quebec				
Montreal:—				
Marconi Wireless Tel. Co.	CFCF	440	150	500
Can. Westinghouse Co.	CFZC	400		
B. L. Silver.	CHCX	420	50	200
Northern Electric Co.	CHYC	410	250	2,000
Dupuis Freres.	CJBC	420	150	500
LaPresse Publishing Co.	CKAC	430	250	2,000
The Bell Tel. Co.	CKCS		250	2,000
Ontario				
Fort Frances:—				
International Radio Dev. Co.	CFPC	400	25	100
Hamilton:—				
Can. Westinghouse Co.	CHIC	400		
Wentworth Radio Supply Co.	CKOC	410	15	20
Iroquois Falls:—				
Abitibi P. and P. Co.	CFCH	400	75	250
Kitchener:—				
News Record.	CJCF	420	25	50
London:—				
London Advertiser.	CFCX	430		
London Free Press	CJGG	430	75	200
London Radio Shoppe.	CHCS	410	100	500
Radio Supply Co.	CKQC	410	50	25
Ottawa:—				
J. R. Booth, Jr.	CHXC	400	50	150
Toronto:—				
Star Publishing Co.	CFCA	400	250	2,000
The Bell Tel. Co.	CFTC		250	2,000
Marconi Wireless Tel. Co.	CHCB	440	150	500
Globe Printing Co.	CHCZ	420		
Metropolitan Motors.	CHVC	410	25	20
T. Eaton Co.	CJCD	410	10	15
The United Farmers.	CJCH	410		
Simons Agnew & Co.	CJCN	410	250	2,000
Evening Telegram.	CJSC	430	150	500
Canadian Ind. Tel. Co.	CKCE	450	250	2,000
Can. Westinghouse Co.	CKCZ	420		
Radio Equip. & Supply Co.	CKKC	410	50	200
Walkerville:—				
Motor Products Corp.	CFCI	440	250	2,000
Manitoba				
Winnipeg:—				
Can. Westinghouse Co.	CFCD	440		
Radio Corporation.	CHCF	430	200	2,000
Manitoba Free Press	CJCG	410	250	1,600
Tribune Newspaper Co.	CJNC	400	150	500
T. Eaton Co.	CKCB	450		
Salton Radio Engineering Co.	CKZC	420	100	100
Saskatchewan				
Regina:—				
Leader Publishing Co.	CKCK	420	200	2,000
Alberta				
Calgary:—				
Radio Corporation.	CFAC	430	200	2,000
W. W. Grant Radio.	CFCN	440	250	750
Albertan Pub. Co.	CHBC	410	200	500
Western Radio Co.	CHCQ	400	100	10
Edmund Taylor.	CJCY	420		
Edmonton:—				
Edmonton Journal.	CJCA	450	150	500
Can. Westinghouse Co.	CHCC	400		
British Columbia				
Nelson:—				
James Gordon Bennett.	CJCB	400	50	20
Vancouver:—				
Marconi Wireless Tel. Co.	CFCB	440	150	500
Victor W. Odlum.	CFYC	400	100	100
Radio Corporation Ltd.	CHCA	430	200	[illegible]
Vancouver Sun.	CJCE	420		100
Can. Westinghouse Co.	CHOC	400	150	150
Daily Province.	CKCD	410	150	500

Broadcasting Carried on During C. N. E.—Apparatus Used in Chain of Stations

The Canadian Independent Telephone Company played an important part in a special radio demonstration at the National Exhibition, as mentioned in the September issue of the Electrical News. All the apparatus used was designed, manufactured and installed by this company. The equipment sent out, for eight hours each day, a continuous flow of music and speech. without the slightest hitch occurring at any time.

In the unit comprising the broadcasting station four large power tubes were used, and two smaller tubes served as modulators. While the set was designed for a maximum input of approximately 2 kilowatts, it was seldom, if ever, operated at more than half capacity. The reason for this is that the ranges secured have exceeded the expectations of the designers and further, the life of the tubes is greatly enhanced by working somewhat below their maximum output.

The efficiency of the set has been found, in actual practice, to be from 60 to 70 per cent, (the exact value depending upon local conditions) that is to say, something like 65 per cent of the energy delivered to the anode circuit of the power tubes leaves the antenna.

The effectiveness and high quality of the modulation is attended by scores of reports from points over the Dominion and the United States.

The receiving set was also one manufactured by this company. It is known as the "Univercal" receiver and consists of a detector and two steps of amplification.

A chain of broadcasting stations that stretches across Canada is another achievement of the Canadian Independent Telephone Company. These stations are located in Toronto, Winnipeg, Regina, Calgary and Vancouver, and are similar in design to the one described above. It has been found that the western stations are able to carry on radio-telephone communication with one another, and that the practical working voice range of each station will be of the order of six to eight hundred miles at night and at least three hundred and fifty miles in the daytime. The Regina station has been heard a thousand miles to the south and on the Pacific coast, and the Toronto station has been heard in Nova Scotia and Georgia.

This company has been carrying on research and development for the past two years, and the present apparatus was only adopted after much painstaking work. It is claimed that a new system of modulation has been developed, which is a real advance in the art of radio communication. Formerly it was necessary to use as modulator units the same size and number of tubes as were used for power tubes; by the new system a comparatively small tube controls the output of the largest power tube.

Recent achievements by this and other radio companies bring Canada to the forefront in the wireless game. It may be expected that the art of radio communication in this country will advance as rapidly as in any other country in the world.

The Latest Developments in Electrical Equipment

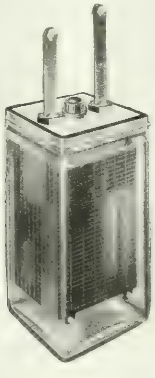
Electric Clock

That the utility of an electric clock can be combined with a pleasing design is proved by one of the newer designs of "Telechron" electric clocks made by the Warren Clock Company, Ashland, Mass., which is shown in the illustration.

The case is brass. The regulating mechanism of these clocks is at the central power station, where a master clock controlling the frequency of the current regulates all of the "Warren" clocks on the system.

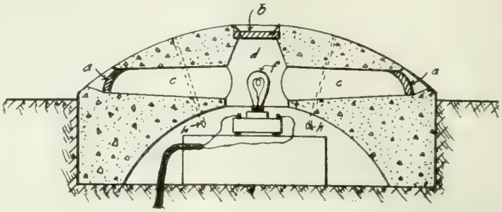
"New-Seal" Battery Cell

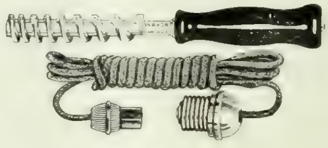
A battery, the jars of which are made of heavy cast glass with a reinforced top, has been placed on the market by the Universal Battery Company, 3446 South La Salle Street, Chicago, Ill. The metal cover fits on a seat inside of the jar with a thin layer of sealing compound between it and the sides of the jar. A large screwed vent opening is provided in the cover, elevated to prevent spilled electrolyte from running back into the cell. Cover and element are bound together by a hard rubber nut which fits on the threaded terminal posts. A tight seal is formed by a soft rubber gasket used below the cover. The manufacturer states that the plates are hand pasted and are uniform in weight and finish. Wood separators are used. A lug is cast on each end of the plate through which a hard rubber rod passes, serving as a separator support.



A New Traffic Light

This traffic light is constructed of indestructible material and embodies an illuminating device, built in such a way that it cannot be damaged or broken. It consists of a dome-shaped reinforced concrete body containing a chamber in which are arranged the necessary electric light connections. From the centre of the body there are a number of bores (c) extending radially, the outer ends of which are closed with colored lenses (a) placed diagonally therein. A relatively larger lens (b) is also placed within a vertical hole (d). Metal linings assist to a great extent the reflection of the light rays. An ordinary electric light bulb (f) serves to supply the necessary lighting. Air vents (h) are also provided for the purpose of ventilating the interior of the dome. This traffic light device is patented in Canada.



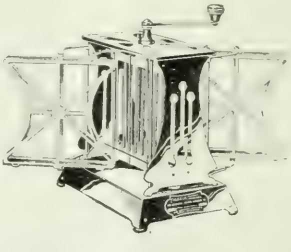


Wavon

The cut illustrates the use of the Wavon, an electrical device manufactured by Frank W. Morse, 289-291 Congress Street, Boston, U. S. A.

"Excelsior" Electric Toaster

The Perfection Electric Products Corporation, New Washington, Ohio, is making an electric toaster in which one turn of the knob at the top operates both racks for the toast. The appliance is equipped with a "70-50" Cutler-Hammer feed-through switch. The arrangement of the coils in the heating element insures an even distribution of heat. The device is being marketed by George Borgfeldt & Company, Sixteenth Street and Irving Place, New York City.



If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Current News and Notes

Belle River, Ont.

A 26,000 volt line is being built from the Essex Hydro high-tension station to Bell River, where an out-door substation will be erected to supply the municipality. The construction of rural lines will be carried on in the adjacent district.

Bloomfield, Ont.

Applications for 80 h.p., for industrial uses have been received by the Bloomfield Hydro-electric System.

Brampton, Ont.

Caledon ratepayers will vote on October 9 to decide whether the council will raise $32,000 to operate an extended telephone system and whether a franchise will be given the Cataract Light and Power Co. to supply light, heat and power.

Brantford, Ont.

Increased rates on Hydro street lighting will take effect on September account of street lighting and will mean an increase of approximately $6,500 per year to the city.

Calgary, Alta.

Calgary's reputation as a leading telephone city with one instrument in use for every 4.10 persons, will be maintained this year, according to Mr. E. Eachers, who is in charge of of the production of the new telephone directory. The circulation of telephone directories in Calgary is approximately 32,000, and this year shows an increase of about 2,000.

Camrose, Alta.

The Pearce Electric, contractors and dealers, Camrose, Alta., have been awarded contracts for wiring of eight houses in Camrose.

The Camrose Municipal Light, Power and Waterworks, Supt. Mr. J. S. Eby, are installing a new boiler at their plant, manufactured by Goldie and McCulloch Ltd., Galt, Ont., fired by stokers manufactured by the Underfeed Stoker Co. of Canada Ltd.; also installing a feed pump in connection with boiler, and making necessary alterations to boiler house for new boiler.

Cardinal, Ont.

The village of Cardinal has requested the Hydro-electric Power Commission to submit an estimate on the cost of supplying electric energy to the municipality.

Chatham Ont.

It is announced that the C. W. & L. E., whose lines run from Wallaceburg to Erie Beach, will undertake extensive repairs to their tracks during the present fall season in order to get the road in good shape for the winter traffic. It is stated that five thousand ties have already been purchased from the C. and J. Hadley Lumber Company, and these will be used up immediately in the ballasting, which will be done, both north and south of the city.

Edmonton, Alta.

The Hillas Electric Company, 10041 Jasper Avenue, Edmonton, Alta., have been awarded the contract for wiring, lighting fixtures, and switchboard for the new library of the Edmonton Library Board, at an estimated cost of $3,686; also the contract for the wiring of the new barns at the Feeble Minded Home at Oliver, Alta.

On October 1st., a by-law will be voted on regarding the expenditure of $325,000 for a power plant.

Estevan, Sask.

In a report to the local council, the town engineer has recommended the installation of an additional generator. Increased domestic use and the addition of several street lights has increased the load beyond the capacity of the present plant.

Hamilton, Ont.

In connection with the problem of having the overhead wires in the centre of the city removed the cost of putting the fire alarm wires underground would be about $16,000 Controller Davis stated recently. Chief TenEyck had plans for an elaborate fire alarm system which would cost $109,000, and would wholly replace the present one. According to statistics produced by the city engineer, there were at present 1,300 poles in the underground district. Of this number 630 could be removed. Those left would be mostly the small iron standards used to support the street railway trolley wires.

Judgment allowing the appeals of the seven bus companies carrying on business between Hamilton, Cayuga, Dundas, Guelph, Waterdown, Binbrook and Toronto, has been given by Judge Gauld. The appellants were engaged in transporting passengers between Hamilton and outside points and do no city business. It was contended on behalf of the city that it had expended large sums in the construction of roads and therefore it should be allowed to tax omnibuses operating from other municipalities for using the highways. The Judgment stated that the merchants of the city who contribute through their taxes to the construction of these roads are materially benefitted by the passengers brought to the city by these omnibuses and the imposition of such a license fee as the by-law calls for would cramp and harass trade.

Kemptville, Ont..

The Greenville Crushed Rock Company have discarded their steam plant and are using 400 electrical horse-power.

The Kemptville Milling Company, who supplied the municipality previous to the advent of Hydro Power, has brought two lawsuits against the municipality asking for arbitration between the company and the municipality, but in both cases the court has decided in favor of the municipality with costs against the company. As a final effort, however, the Kemptville Milling Company are now sueing the town of Kemptville for $46,000.00 damages done to their property by the town in erecting a new distribution system. The municipality takes the stand that this company has no franchise, or any rights whatever, on the streets of the village.

Kitchener, Ont.

Messrs. Ellis & Howard Ltd., of Kitchener, Ont., recently opened a branch store dealing in electrical fixtures and appliances, at King Street, Preston, Ont. The store, which is a very large one being 40 feet wide by 85 feet long, is located in a good section of the town, right in the centre of the main street. The store is managed by Miss E. L. Schartzber.

Lindsay, Ont.

Messrs. Pickering & Cote, of Lindsay, Ont., have recently purchased the interest of the Electric Wiring Co. Both are well-known to the trade, having done business in this town for many years. They report that business is good.

London, Ont.

A report on the London Street Railway dealing with its present value and means and costs of improving it should the citizens decide in favor of purchase, will be prepared by the Hydro-electric Power Commission experts, it is stated. The report will be available before December, when a vote of the people on the street railway policy is to be taken.

Just east of Ashland Avenue a cable belonging to the Bell Telephone Company, containing over 200 wires, was struck by lightning in a recent storm and together with the drenching the wires received, the whole cable was put out of commission. Throughout the city some three or four hundred services were rendered useless, but it was stated that they would be repaired in short order.

Manitou, Manitoba..

The citizens of Manitou have prepared a large petition asking for the extension of a transmission line to that town. This would involve an extension of the Portage la Prairie line.

Montreal, Que.

In response to an inquiry as to what use is being made of the proceeds of the five million dollar issue of stock made last spring by the Bell Telephone Company, President L. B. McFarlane said recently: "Just as quickly as it can be done, we are converting that five million dollars into revenue earning telephone plant. We have made such satisfactory progress so far as to very materially cut down the list of waiting applicants for service. At the peak of the demand last April there were some 31,178 unfilled orders for connection on our books. This has been reduced to 23,592, and the total gain exceeds 16,000 suscribers' telephones. Full gangs are now in the field and the construction of additional exchange buildings, switchboards, underground conduit, and pole lines for overhead wires and cable is progressing rapidly."

The Canadian Comstock Company Limited, Montreal, have been awarded the contract for the electrical work on the million dollar addition to the plant of the Durant Motors of Canada, Limited, at Leaside, Ont. They are also installing the complete electrical work on the new pulp and paper mill for St. Lawrence Paper Mills, Limited, at Three Rivers, Quebec. This contract includes installation of high and low tension electrical work in sub-station, and distribution feeders for power and lighting; it also includes high and low pressure and boiler house steam piping work. Other contracts include the electrical work on the Medical Arts Building, Montreal, for which the Foundation Company are the general contractors; and electrical work on four cargo boats for George H. Hall, Fraser-Brace and Company, general contractors.

Niagara Falls, Ont.

The Hydro-electric Power Commission has recently approved of an additional debenture issue of $100,000 for the Niagara Falls Hydro-electric System to take care of extensions and improvements to the local plant. The Niagara Falls System has shown a remarkable growth in connection with domestic service during the past year. Manager P.B. Yates of the Public Utilities Commission stated recently that the Niagara System load was the heaviest now of any time since the armistice was signed.

Ottawa, Ont.

The total amount of electrical power exported from Canada to the United States during the fiscal year ending March 31, 1922 was 861,567,183 kilowatt hours, being a decrease of 157,996,828 kilowatt hours as compared with the previous year.

Major F. D. Burpee, general manager of the Ottawa Street Railway, on behalf of the company, and F. W. McRae, president of division 279, signed an agreement recently between the company and the men, based on the finding brought in some three months ago by a board, of which, Alexander Smith, K. C. was chairman. The chief clause in the agreement signed to-day, and the one on which the company and men finally agreed on, reads as follows:—"The company agrees to meet with and treat, through their properly credited officials, with officials and representatives of division No. 279, upon questions and differences that may arise durng the term of this agreement, including dismissals, after suspension."

Portage La Prairie, Manitoba.

Owing to the delay in the shipping of steel towers, repairs to the Portage la Prairie transmission line have been delayed. Three carloads of towers will be required to place the line in operation once more. The village of Oakville, about 11 miles east of Portage on the south side of the Assiniboine river, will receive power as soon as the line is opened.

Port Arthur, Ont.

Advertisements have run in the local papers, prior to the adoption of one-man operation, by the Port Arthur Civic Railway. The ads. were a good example of utility advertising, giving the reasons for changing over, the new schedules, and stating that the employees and management alike were of one purpose in serving the public in the best interests of the city.

Manager Inglis of the Public Utilities Commission, recently announced that the use of one-man street cars on the local street railway had been approved by the Ontario Railway and Municipal Board.

Prescott, Ont.

Electrification is proceeding rapidly in the Prescott Rural Power District. The Hydro-electric Power Commission now has 66 contracts on this 12 miles of rural line and one consumer is erecting a large saw-mill in the village of Spencerville with the intention of installing a 40 h.p. motor to run a 50 inch saw, planer and other woodworking machinery.

Provost, Alta.

The Town of Provost, Alta, are contemplating installing an electric light plant, sewers and waterworks.

Quebec, Que.

Announcement was made recently that the Quebec Railway, Light, Heat and Power Co., has just negotiated a contract with Denaston Breakey, president if John Breakey Co., for the supply of a large amount of power for a period of twenty years for the operation of the plant at Breakeyville, P. Q. This contract is for a minimum of five hundred horse-power. The Breakey Co. will extend their own transmission line to the company's plant at Breakeyville on the Chaudiere river, and the power will be taken as soon as the work is completed. It is also stated that the company is completing arrangements to furnish about 400 horsepower in excess of present requirements of the Chateau Frontenac Hotel.

A delegation from the Lake St. John-Chicoutimi district waited upon the Provincial Government recently to oppose the building of the Kenogami dam, instead of the erection of a barrage at the Grand Discharge. The argument advanced by the delegation was that the construction of a dam at the Grand Discharge would be of greater general advantage to industry, while the Kenogami dam would only benefit a limited number of interests. The delegation admitted that the Grand Discharge project might entail a larger expenditure, but argued that the results would make it the cheapest in the long run as the power would be a source of supply to the entire Province, as not less than 1,000,000 horsepower would be available.

At a meeting of the directors of the St. Anne Power Co., held recently, the following officers were elected for the ensuring year: President, Geo, C. Bayless; Vice-President, A. W. Cooper; Treasurer, F. J. Bayless; Secretary, C. E. Taschereau.

St.. Thomas, Ont.

A telephone wire, falling across a 2,200 volt Hydro-electric power wire at Dutton on Sept. 20, resulted in the electrocuction of Reginald Gillard, a lineman in the employ of the Bell Telephone Company.

St. Catharines, Ont.

Arrangements have recently been made for the construction of a rural distribution system in the Beamsville district to supply approximately 400 rural consumers. Power for the district will be transmitted at 12,000 volt from St. Catharines and stepped down at an outdoor sub-station. The 12,000 volt line will also be extended to Grimsby.

Stratford, Ont.

At a meeting of the Ontario Railway and Municipal Board it was decided to charge all subscribers of the North Easthope Telephone Company $5 extra for two years for the purpose of meeting the liability caused by the ice storm last winter.

Shawinigan Falls, Que.

L. G. Cummings, employed by the Shawinigan Power Company, was electrocuted recently, when he touched a wire carrying 6,600 volts.

Stouffville, Ont.

Mr. P. R. Stover, well-known to the electrical trade. and a returned man, has recently been selected for the position of superintendent of municipal electrical lighting at Stouffville, Ont., by the Municipal Council, to supersede Mr. H. Kenmear.

Tononto, Ont.

Among the resolutions passed at the first annual convention of the Canadian electrical trade union held recently was one requesting provincial legisiation to license electrical workers, similiar to that introduced by Charles Swayze, M.P.P. of Niagara Falls, during the last session, and another requesting that the inspection system of the provincial Hydro-electric Commission be placed under the Labor Department.

Toronto, Ont.

Messrs Cavers & Harvey recently of Brock Ave., Toronto, have opened a new store at 2021 Yonge Street, well stocked with everything in electrical fixtures and appliances. The store is known as the Hyglo Electric.

F. G. Taylor & Sons, electrical dealers, late of 1162 St. Clair Ave., Toronto, have removed to a new store at 1664 Dufferin.. .

E. L. Roxborough, Limited, have sent out notices announcing this new firm of electrical contracting engineers as successore to Ramsden and Roxborough. A formidable list of important electrical work is given as evidence of the wide experience of Mr. Roxborough.

Mr. J. V. Stark, manager of the Continental Electric Company, King Street East, Toronto, manufacturers of the Royal vacuum cleaners, is on a business trip to Vancouver. He is covering territory both ways west of Winnipeg.

Getting out from his truck to remove an electric wire which obstructed the road on Yonge street, near Davisville avenue, Danial McMarrow took hold of the wire, wound it round a post once, and then received an electric shock, from which he died shortly after.

It was recently decided by the Board of control to arrange a conference with the Provincial Hydro Commission on the question of taking over the Toronto Suburban lines and the price to be paid for them. The principal question to be discussed is whether the Hydro can still purchase these lines from the Dominion Government at the price mentioned some years ago.

In a speech at the Canadian National Exhibition, Sir Adam Beck pictured the approach of the time when Hydro-electric radials would bring 2,000,000 to the fair. His speech was mainly a plea for the radials, and he made the challenge that if the radial lines were given a free right-of-way through the country they would carry traffic at one-fifth the cost of motor bus transportation. He predicted that out of Buffalo alone his Niagara Radial would bring 100,000 people in two weeks. He promised the C.N.E. heads that the Exhibition would not suffer by reason of the right-of-way cutting through the Exhibition park.

The cost system under which the Toronto Railway Company was compelled to take over the railway property back in 1891 should be a guide as to the condition under which it must sell to the city, according to the argument which was advanced on Sept. 19 by Hon. N. W. Rowell, legal representative of the company, who opened the argument in the Street Railway arbitration case. Some thirty years ago, Hon. Mr. Rowell pointed out, the Railway Company was obliged to buy the old horse-car system, in face of the fact that it knew at the time it would be compelled within a very short time to re-equip the system and fit it out for an electrical service. In other words, the principle applied on that occassion was that the company had to buy the existing system at the cost of reconstruction, less depreciation; so Hon. Mr. Rowell declared that the same principle should be applied now. As he sees it, the city should be instructed to pay the Railway Company for the line on the basis of an operating concern, and the figure should be the cost of construction for the three-year period prior to 1921, less depreciation.

Uxbridge, Ont.

Hydro will shortly be installed in Uxbridge, Ont. Preparations are almost completed, and it is hoped the change from municipal lighting to hydro will take place in the next few weeks. It is interesting to note that this little town has been enjoying the benefits of electric lighting for the past 35 years. The municipality purchased the plant from private ownership about 4 years ago.

Walkerville, Ont.

Application of the Freeman-Bondy Bus Company to institute a bus service in Walkerville has been refused by the town council. Mayor Stodgell and councillors, in refusing the application, point out that they are in duty bond to support the Hydro-electric Railway wherever and whenever possible.

Occupancy of the $60,000 Hpdro-electric block will take place soon, according to officials of the company. The building is one of the most handsome structures erected on Wyandotte street in its history. With the installation of Walkerville's new "White Way" along this section of Wyandotte street, the location should prove to be one of the best in the Border Cities. Large display windows on Wyandotte street and Argyle road will contain every known electrical convenience used in the modern home.

Winnipeg, Man.

A resolution recently passed by the Winnipeg branch of the Canadian Manufacturers' Association reads as follows:—

"Whereas the city of Winnipeg proposes to erect a steam standby plant with an immediate capacity of 12,000 or 15,000 h.p., at an estimated total cost of $1,500,000 to supply power for the operation of its street lighting and waterworks system and to supply commercial plants in the event of an interruption to the Hydro-electric system; and whereas the erection of this standby plant will also involve the expenditure of a large sum of money annually for maintenance and whereas the Winnipeg Electric Railway company already maintains a steam standby plant in Winnipeg;

"Therefore, be it resolved that the Winnipeg branch of the Canadian . Manufacturers' Association respectfully urge the city council to enter into negotiations with the company with a view to arriving at some satisfactory plan for the joint use, in cases of emergency of the Winnipeg Electric Railway Company's power by that company and the city hydro department, before proceeding with the expenditure of a large sum of money by the city for a separate steam stand-by plant."

Wiring Contracts Awarded

Ancaster, Ont.

Jno. Fish, 291 Crockett St., Hamilton, $17,000 res.

Brantford, Ont.

T. J. Minnes & Co., 9 King Street, Brantford, $105,376 school, Grand & George Sts

Hamilton, Ont.

Culley & Breay, 35 King St. W., altn. to stores & offices

J. A. Dynes, Prospect St., $8,000 altn. apts., 11-13 Bond St.; $22,000 apts. (16) Barton St., East.

Kentville, N. S.

Perce DeFry, $6,000 res., Main Street.

Kingston, Ont.

James Harris, 4 Cooper St., dairy school.

Moncton, N. B.

Wm. G. Crowley, St. George St., $5,000 each two res., West St.

T. Johnson Co. Ltd., Main St., $6,000 res., Winter Ave.

J. W. Fraser, 132 Steadman St., car barn.

Montmorency Village, Que.

Nap. Boily, $8,000 fire hall, Co., Montmorency.

Montreal, Que.

Crown Electric Co., 169 Ontario W., $28,000 presbytery Delormier Ave.

A. Gauthier, $8,000 three flat res., Hutchison St.

Ernest Gregoire, 170 St. Timothee St., $25,000 two res., Botrel St.

O. Labelle 332 Seigneurs St., $8,000 res., Montclair Ave.

J. Mathieu, 1117 De Castelneau St., $14,000 six flats, Bellechasse.

R. S. Muir & Co., 32 Park Ave., $17,000, two cottages, 35 & 37 Grey Ave.

F. Neyrinck, 802 De Gaspe St., $9,000 res., Bercy St.

Rene Deliger, $50,000 apt. house, Berri & St. Catherine Street E.

Sayer Electric Co., 87 Bleury St., $50,000 warehouse, Notre Dame E.; $30,000 res., Montrose Ave.

R. Talbot, 2112a Boyer St., $15,000 four res., Chambord Street.

Convention of Contractors and Dealers in Toronto, November 13 and 14

New Liskeard, Ont.

Toronto Electric Co., 101 Duke St., Toronto, continuation school, wiring.

Outremont, Que.

Sayer Electric Co., 87 Bluery St., $125,000 apt. house, Bernard Ave.

Ottawa, Ont..

Stan. Lewis, 63 Metcalfe St., $110.000 office bldg., Gilmour & O'Connor Sts.

W. J. Tapp, Armstrong St., $7,000 res., Parkdale Ave.

Fred Wilson, 128 McLeod St., $60,000 add. to dairy bldg. Somerset St.

Renfrew, Ont.

Harris & Marson, 81a Parkway Ave., Toronto, $200,000 collegiate institute.

Sault Ste. Marie, Ont.

O. C. Carney, 516 Queen St. E., $4,000 res., Pim St.

Penfold & McBride, 275 Bruce Ave., $4,500 res., Simpson Ave.; $4,500 res., Gordon Ave.; $4,000 res., Dennis St.

Taylor Bros., Gore St., $8,000 store block, Wellington St.

Stratford, Ont.

Bennington Electric Co., Ontario St., $3,000 res., Devon Street.

W. J. Gaul, Charles St., $4,500 two res., Kent Lane.; $3,500 res., Albert St.

Toronto, Ont.

Salisbury Electric Co. Ltd., 112 King W., preparatory school bldg., Deer Park.

E. McNiece, Long Branch, $3,000 grocery store, Lake Shore.

Geo. Armstrong, 1217 College St., $9,000 res., Beresford Ave.; $15,000 res., 31 Woodycrest Ave.

Bayview Electric Co., $7,500 addn. to store, rear 378-80 Yonge St.

Bennett & Wright, 72 Queen E., $150,000 res. & garage, Bayview Ave., York Twp.

Major Electric Co., 7 Bloor E., $6,000 res., Chesterhill Road.

Westmount, Que.

Sayer Electric Co., Bleury St., Montreal, $20,000 pr. semi-det. res., Grosvenor Ave.

Winnipeg, Man.

Star Elec., Co., 185 Lombard St., Wpg., $220,500 office bldg., Kennedy and Graham.

Company Incorporations

Below is given a list of 9 incorporations that have recently taken place. One incorporation does not mean much, but a group of 9 has significance. Business is steadily improving, money is loosening and expansion is taking place. The number of concerns being incorporated for the purpose of making or otherwise dealing in radio equipment is an indication of the effort that will be put into this business in the future.

Come to the Convention, Nov. 13 and 14.

Wireless Corporation of Canada, Limited, $50,000, Montreal; manufacture, etc., of all kinds of wireless goods.

Kerr Line Telephone Company, Limited, $7,000, Foresters Falls, Ont; construction and equipment of telephone systems.

The Brudenell Telephone Company, Limited, Brudenell, Ont.; construction and equipment of telephone systems.

Whitman Radio Company, Limited, $20,000, Montreal; manufacture, etc., of radio equipment.

Electric Lighting Products, Limited, $40,000, Toronto; manufacture, etc., of electric fixtures and other electrical goods.

Western Electric Company, Limited; supplementary letters patent decreasing capital stock from $2,500,000 to $746,000.

Dominion Insulator & Manufacturing Company, Limited, $50,000, Niagara Falls, Ont.; manufacture, etc., of porcelain and other insulating materials.

Transportation and Power Corporation, Limited, $15,000,000, Montreal; to purchase assets of the Great Lakes and Atlantic canal and Power Company, Limited, and carry on business.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

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ADVERTISEMENTS

Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Results Follow United Action

The activity in the sale of electric heaters during the past two weeks is the best evidence we could possibly have of the immediate value of concerted action. Everywhere we turn the electric store window is displaying heaters, until the conception of a cosy evening produced electrically has so fixed itself on the mind of the average householder that he cannot get away from it. He sees it during his office hours or he discusses the coal situation with his business associates; he sees it on the way home as he pictures himself entering a cold, damp house; he sees it as his wife comes forward, shivering, to meet him; he sees it as he sits uneasily at his evening meal and as he vainly tries to settle himself comfortably with his evening pipe and paper. The electrical industry for once has acted in unison and the result is that manufacturers of electric heaters are all flooded with orders, dealers' turnovers are the largest in their history, innumerable wiring jobs have been sold and electricity has made thousands of interested, enthusiastic friends, who will continue to buy electric goods of every kind through the years to come.

The circumstances that assisted in bringing about this condition were somewhat unusual and urgent it is true but, analyzed deliberately, it is probably a fact that the effect of the coal shortage scare was more noticeable on the electrical dealers themselves than on the general public. It awakened the dealer to the possibilities underlying the sale of electric heaters for autumn use and it gave him one added argument. It is not evident, however, that a similiar campaign, equally vigorously and unitedly prosecuted, would not have produced the same results—without the coal shortage. There were sufficient arguments before; only the enthusiasm was lacking.

The lesson to be learned, we believe, is that best results can only follow united action. It is not necessary to wait for special opportunities or special conditions. Now that the heater campaign has proved a success, let's try the same tactics with other household appliances. Take electric washing machines for example.

Suppose every electrical dealer featured nothing in his windows for the next two weeks but electric washing machines, talked washing machines and advertised washing machines so that every where the housewife turned she was confronted with the uncomfortable fact that her way of doing this piece of drudgery was out-of-date and unnecessary slavery. Suppose the man of the house in addition were bombarded with literature picturing the actual slavery of the old washboard as used in his home week after week. Following this up judiciously by personal home calls. Such campaigns carried on locally have sold hundreds of machines per week . Why not sell them in all the towns and cities in Canada at the same time—and rate? "One thing at a time," has been a slogan so long that it has lost some of its force but its truth is as evident as it ever was.

If the electrical industry in Canada will so organize that it can operate as a unit and then, as a unit, concentrate on one appliance at a time, we can have a long series of sales successes equal to that at present under way in electrical heaters.

The Business Papers' Influence

Press Day has become an established feature of the Canadian National Exhibition and the luncheon addresses are notable for the valuable information they invariably impart. At this year's luncheon, Mr. H. T. Hunter, vice-president of the Canadian National Newspapers and Periodicals Association, and speaking more especially for the technical and business publications, stressed the importance, to the Exhibition, of the type of publicity afforded by these publications, due to the selected class of readers they reach. He stated that the circulation of business and technical magazines in Canada was approximately four hundred thousand, composed of readers who looked to these publications for much of the information necessary to enable them to conduct their business along profitable lines and who consequently scrutinized every issue very carefully.

The speaker also referred to the common aims of the Business and Technical Newspapers and of the Canadian National Exhibition. The educational aspect is the most important in each case. Quoting Mr. Hunter, "We are on common ground in educational work. I believe this Exhibition was started primarily for educational purposes and its great success is due to the fact that you have never allowed the amusement side to dominate. I believe the educational features should be given wider publicity. The individual exhibitors do a great deal in this connection but there is much to be done collectively. A few people would come to see a few exhibits of motor cars, but thousands will come when they know there will be seventy exhibitors representing probably 70 per cent of the manufacturers who are seeking Canadian business. In our Association there is a publication for practically every line of business. These publications have told, year by year, the outstanding events of the Exhibition that would be of interest to their readers, and I think we can claim that this has been a factor in increasing interest and attendance of a very desirable class of people."

The further valuable point was emphasized that the exhibition authorities were especially interested in bringing in the men and women who have "a stake in the country—the responsible people, the people of large buying power," in a word, the class of people who read and study business and technical papers. In every line of endeavor our publications reach a very large percentage of business men and women who have come to regard their trade-papers as business associates.

Mr. Hunter's concluding sentence will meet the hearty approval of all members of the Association. "The publications in our Association will be very glad to co-operate with you, not only in organizing exhibitors and inducing them to guarantee the cost of the buildings, but in making the buildings a success after they are erected by bringing to the Exhibition the class of people these exhibitors want to reach. For, after all, the real success of an Exhibition does not consist in large buildings or elaborate exhibits but in the class of people who attend."

Reunion of Engineering Alumni, University of Toronto

A grand reunion of "School" graduates is scheduled to take place on October 27 and 28. The committee in charge has arranged a programme that ensures a large attendance; it includes class luncheons, a dinner dance and the Queen's vs. Varsity game on the 28th. An announcement of the reunion is worded as follows—"These meetings have grown into a golden opportunity to revive old college memories and to renew old friendships. They are becoming part of the School tradition of loyalty and unity.—Come and enjoy yourselves in the old familiar haunts. Carry away with you fresh enthusiasm to build Varsity ideals into business and fresh inspiration to carry on the loyal traditions of the old School." Judging from the favorable comment that is heard among School men in general, this present reunion should prove to be one of the most successful. The old spirit is as strong as ever, and every man that possibly can is going to be there and shout Toike Oike again.

C. D. Schnebly Addresses Toronto Section, A. I. E. E.

A large number of members and visitors were present at the first meeting of the Toronto section of the American Institute of Electrical Engineers, which was held on September 29 in the Electrical Building of the University of Toronto. Mr. F. R. Ewart acted as chairman.

Mr. C. D. Schnebly, of the Northern Electric Co. gave a paper on Automatic Telephony which was well illustrated by lantern slides. He opened his talk by referring to the magnetic system where the subscriber had to crank a generator at his telephone to signal the operator. He then proceeded to outline the operation of the manual system and compard it with the operation of the automatic system. With the use of lantern slides he traced a call from the instant the subscriber lifted the receiver from the hook until the connection was completed, explaining how the dial, relays, switches, etc., functioned to give the party required.

Three methods were shown that could be used in handling automatic to manual and vice versa calls and it was explained how this would be done on the new automatic exchange now being installed in Toronto. How the automatic system took care of all classes of calls such as "Busy", "Don't answer," "Disconnected Numbers," and also pay phones, party lines, etc., was also demonstrated.

In conclusion Mr. Schnebly outlined the growth of the automatic system in Canada and showed slides of the Canadian factory where the equipment is being manufactured for the new Toronto exchange. A very vigorous discussion took place after the paper and the speaker was called upon to answer many questions.

Canada's abundant harvest, as reported from coast to coast, is resulting in cash distribution or credits which will, in all probability, equal, if not surpass, the previous record.. This will set into circulation vast funds, approximating $2,000,000,000, and will, inevitably have a marked effect on every line of business.—A. E. Ames & Co.

Hamilton Hydro to Have Model Building

The Hamilton Hydro-electric System has recently purchased the property at 12 King St. East, formerly occupied by the Bank of British North America. This is one of the best sites in the business section of Hamilton. The present building is to be remodelled and a new building will be erected at the rear, of fire proof construction, to contain offices and ware rooms. The alterations and extensions to the building are being supervised by Hutton & Souter, architects & engineers, Bank of Hamilton Building, Hamilton. V. K. Stalford is in charge of the electrical installation and equipment for the architects.

Tenders were called recently for the electrical work and the contract has been awarded to Culley & Breay, King St. West, Hamilton. Some of the chief points of interest in the electrical installation will be:

The service supplying the building will be 3 phase, 2,200 volt, 25 cycles and will enter the building underground to a sub-station. This sub-station will be 12' wide by 27' long. The total installation when completed will consist of five 50 kw. transformers. There will be 100 kw. of electric heating used. A very large show room is to be provided for in a mezzanine floor and balcony, with outlets suitably located for the connection of ranges, ironers and all classes of appliances. Connections will be made by means of 3 wire, flush type plugs at the front of the show room. Facing on King Street large show windows are being provided. Provision is being made in the show room for demonstration of ranges, ironers, etc. When completed this building will be a model central station electrical show room.

Report Quebec Streams Commission

The tenth annual report of the Quebec Streams Commission, which covers the operations of that commission for the year 1921, has just been received. It contains detailed reports of the chief engineer, Mr. O. Lefebvre, on the very varied and extensive operations of the commission throughout the Province of Quebec.

Professor Gill to Hamilton

Prof. I. W. Gill, head of the department of mechanical and electrical engineering at the University of British Columbia, Vancouver, has been appointed principal of the Hamilton Technical School. He will assume his new duties on November 1.

The Application of Electricity in the Manufacturing Industry--8

Majority of Lumber Mills Not Motor-driven—Necessity of Using Wood Waste a Factor—Electrification Has Proved Profitable Where Adopted—Squirrel Cage Motors Largely Used

The lumber industry is just beginning to use electricity. Out of the hundreds of saw mill owners and logging operators in the country, those who are thoroughly convinced of superior efficiency of electrical operation are relatively few in number. However, an encouraging feature of the situation is the fact that many have been coming into the fold recently, and the prospects are that the next few years will see the number greatly added to.

There is no great preponderance of electricity users in either of the main branches of the industry. Here and there we find the logger using electrically driven donkey, locomotive or loader. Somewhat more often there is a sawmill which uses electric motors to drive the various machines, or an electric stacker or yard runabout.

It might reasonably have been expected that the sawmill man would be a large user. The change from steam to electric drive does not involve any radical change in mill methods, and on the surface the advantages of the innovation would appear to be obvious. There are, however, potent reasons for the apparent conservativeness of the mill-owners. Most plants have at their disposal a large quantity of wood waste, the possession of which, and the necessity of disposing of it somehow, make a wood-fuel prime mover a desirable driving force. Thus the reciprocating steam engine has been a general favorite with men who are otherwise forced to pay for power while burning up tons of saw-dust and ends in their waste piles and burners.

Advantages of Electric Drive in Sawmill

Recent installations, however, have demonstrated that in certain cases it pays the mill-owner to install a self-contained plant, in which he burns his waste under properly designed boilers, and uses the steam for the generation of electricity. In such cases a double advantage is secured in that part of the steam may be used for drying or heating purposes.

Other economies effected by electric drive in sawmill operation may be listed as follows:

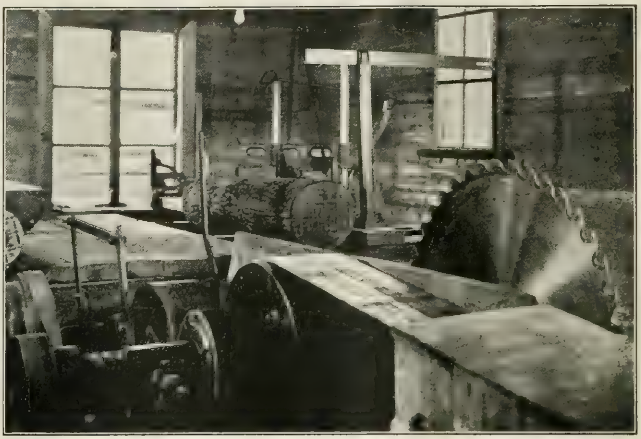
(1) No loss of power turning idle shafting.
(2) Less life hazard from belts.
(3) Economical intermittent operation of machines.
(4) More light due to absence of overhead shafting.
(5) Maintenance costs cut down.
(6) Extensions readily made.
(7) Fans and blower systems easily installed.
(8) High resale value of equipment.

Engineering Considerations

The engineer who is called upon to furnish electrical equipment to a sawmill has an interesting problem. In the first place he has to determine whether it is more economical to purchase power from a central station or to generate it within the plant. In the second he has to determine an advantageous layout of machinery and motors, and in the third and fourth to decide upon how far individual drive is advisable, and what are the best motors for his purpose. The question of illumination is also generally referred to him, and forms an interesting side issue.

The answer to the first and second propositions is determined by local conditions. If there is plenty of cheap power available in the neighborhood, and there is little mill waste, the answer is obvious. In the second case the layout varies with the mill product and the engineer is guided by previous experience. The answer to the third consideration

Gillies' Bros., Plant at Braeside, Ont.—The mill is constructed of steel and concrete throughout—all machinery electrically driven—equipment includes 18 electric motors.



A motor-driven Circular Saw—cutting samples for testing.

is determined largely by what the owners feel like spending on the project, and the type of motor used is settled by the machine requirements.

Lumber cutting is intermittent and, of course, the power required varies in proportion to the size of the cut. Hence the problem is to find a motor that has a long range of efficiency around normal load. The tendency is to overload the motors, with the result that efficiency drops and the running cost amounts to more than it would have cost to instal a larger motor.

Motors Used

The squirrel-cage motor is used for driving the great majority of machines in the lumber mill, particularly edgers, trimmers, slashers, sizers, matchers, hogs, and in general machines that are not subjected to starting under very heavy loads. It is essentially a constant speed machine, and therefore not suitable for applications where a variable speed is required.

The wound-rotor motor is particularly suitable for application where the machines are started under heavy load, such as the log haul gang or resaw, or where speed variation is essential, such as the feed of edgers, cut off saws, and resaws, or rolls used for accurately "spotting" timbers.

Heavy peak loads such as are continually demanded by band mills and edgers are thrown on an engine, there is a slowing down in the entire mill as much as 5 to 7 per cent and sometimes up to 10 per cent on a poorly regulated engine. This cannot occur with individual electric drive, and when these heavy peaks are demanded, the only slowing down will be in the individual machine itself, amounting to the slip of the motor which will not be more than from 2 to 5 per cent.

A comparison of the operating costs of a large number of steam and electrically driven mills shows that there is a decided reduction in the cost of operation. This can be accounted for by a reduction in the number of mill-wrights, oilers and helpers about the mill; saving in renwals of worn-out bearings, belts, etc.; oil, minimum number of shut-downs due to breakdowns, a constant rate of production throughout the entire mill and lower insurance rates.

Less Oil Required

A comparison of the quantity of oil required by steam and electrically driven mills of the same capacities shows that there is a large saving in this item. Oil used in induction motor bearings is used over and over again, whereas oil used on line shaft bearings is used once and they require oiling every day.

The Wiring Installation

A proper wiring installation for a mill should have the wires run in conduit because conduit gives the insulation permanent protection from dust and from moisture, such an installation prevents tendency of open wiring to sag and will last as long as the mill building. Incandescent lamps should be covered by wire guards and large diffusing light units hung high above the plane of work should supplant the drop cord and bare lamps. Such a wiring system in a mill will cut down the bill for insurance and deliver a maximum of illumination with a minimum consumption of electrical energy.

Typical Mills

The plant of Gillies Bros., Limited, at Braeside, Ont., is an interesting example of complete electrification. The mill has a capacity of 150,000 feet a day. It is of reinforced concrete construction, with trussed steel roof.

The power house is a separate brick and concrete building 50 by 80 feet, and contains five 72 inch tubular boilers. These are equipped with Dutch ovens, which are fed by gravity from an overhead conveyor that delivers all the sawdust and log chips from the mill. In the engine-room adjoining the main power unit is an Allis-Chalmers condensing turbo-generator of 500 kv.a. As a precaution, there is an auxiliary connection to the system of the Galetta Electric Power and Milling Co., so that in the event of breakdown a certain amount of power can be obtained.

Each of the three band saws is operated by a 150 h.p. slip ring motor and the band resaw by a 100 h.p. motor.

At the top of the jack ladder the logs are measured as they come up and the jacker operates steam kickers which throw the logs in the different decks for the band saws. At the immediate left there is a chain transfer which carries the medium-sized logs to one band well. To the shorter deck on the same side of the log chain, but farther back, are forwarded all the small logs to supply the centre band mill where some of the very small ones are split in the middle and sent on live rolls and transfers back to the 7-foot horizontal band resaw, which takes care of all slabs. There are three Clark Bros. edgers in the plant, two being single, with three saws, and the third a double 2-man edger, with six saws. The motors driving these are direct connected, the rotors being keyed to the arbors.

An interesting sidelight on the value of electrification is revealed when it is known that since the adoption of this form of motive power, combined with the fireproof character of the plant, the insurance rate has been reduced from $4.50 to 35 cents per $100.

Canadian Western Lumber Company.

The Canadian Western Lumber Company's plant on the Fraser River uses electric power as follows:

Cedar sawmill	918.5 h.p.
No. 1 planing mill	917.5 h.p.
No. 2 planing mill	544.0 h.p.
Finishing shed	395.0 h.p.
Shingle mill	480.5 h.p.
Sash and door factory	315.5 h.p.
Veneer plant	153.5 h.p.
Isolated machinery and yard equipment	571.0 h.p.
Plant lighting	207.0 h.p.
Town lighting	260.0 h.p.
Total	4,762.5 h.p.

This is one of the largest electrically equipped saw mills in the world. There are over 200 motors ranging up to 250 h.p. in size. Squirrel cage and slip ring type are used and the system load factor is approximately 80 per cent. The planing mills, including 620 h.p. in fans, operate at a particularly high load factor. Individual drive is used except where fluctuating load conditions in several machines of a kind make grouping advisable to maintain a steady load on the motor.

Power-Factor Correction

An average power-factor of 82 per cent was obtained on the original installation. Since then two 350 kv.a., synchronous condensers have been installed, with the result that the power-factor has been raised to over 90 per cent.

Power is generated within the plant and is furnished from a set of turbo-generators. Steam is supplied from a battery of tubular boilers, which are fired exclusively with plant waste.

The switchboard is composed of 11 panels. A swinging bracket carries exciter voltmeter and synchronoscope, and tirril regulator. Each main generator panel is equipped with three main ammeters, a voltmeter, a field ammeter and an indicating wattmeter.

The plant of the L. H. Heaps & Co., Ltd., Ruskin, B. C. is also completely electrically driven. In this case power is brought from a central station about seven miles distant. Transmission is carried out at 12,000 volts. The power is stepped down by a 1,000 kw. bank of transformers. There is over 1,500 h.p. of motors installed and very little operation trouble is experienced.

Opportunities for Electrification

At the present time the electrification of lumber mills appears to present one of the greatest opportunities for the electrical industry. The total capital invested in the lumber industry in Canada amounts to $234,793,646, of which approximately one half is represented by mills. Here we have a figure of $117,396,823 in lumber mills alone.

This is represented by over 2,500 sawmills, scattered over the whole of Canada. These are not all of large size, but they all use power of one kind and another. Out of these 2,500 mills, not five per cent are electrified. The tide seems to be turning, owners are becoming convinced of the manifold advantages of electric drive. What remains to be done is to go after them intensively and make two of Canada's greatest basic resources, her water power and her great forests, each a help to the development of the other.

An electrically driven lumber shfter

In our next issue an account will be given of the uses of electricity in the logging end of the industry.

Exportation of Electric Energy from Canada

The table given below, taken from a statement of the Department of Trade and Commerce, Ottawa, just published, gives some interesting figures relative to the production and exportation of electric energy in Canada for the year ending March 31, 1922. It will be noted that the totals given are applicable only to those concerns which export power and do not include the large number of central stations which provide energy for domestic consumption only.

	Units Produced for Export		Units Produced for Use in Canada		Total Output of Generating Station or Other Source	
Central Stations	Kw. hours	H.P. years	Kw. hours	H.P. years	Kw. hours	H.P. years
Ontario Power Co.	304,244,400	46,453	483,439,300	73,989	787,662,700	119,442
Toronto Power Co.	102,122,000	15,629	553,463,500	81,703	635,585,500	97,332
Cedar Rapids Mfg. & Power Co.	324,193,000	49,592	310,500	40,913	591,493,500	90,505
Can. Niagara Power Co.	82,264,000	12,590	393,881,000	60,026	476,145,000	73,616
West Kootenay Power & Light Co.	2,084,900	318	182,384,100	27,891	184,469,000	28,209
Western Canada Power Co.	24,825,300	3,594	82,502,380	12,625	107,327,680	16,219
Ontario & Minnesota Power Co.	12,729,010	1,939	12,254,149	1,873	24,983,159	3,812
British Columbia Electric Ry. Co.	419,692	64	133,020,093	2,035	133,439,785	2,099
Maine & New Brunswick Electric Power Co.	8,460,291	1,296	392,463	61	8,852,754	1,357
Sherbrooke Ry. & Power Co.	252,200	36	5,391,730	826	5,663,930	862
Totals	861,594,793	131,511	2,114,039,211	301,942	2,955,623,008	433,453

Is the Range and Water Heater Load Profitable to the Central Station?*

Successful Development of Cooking Load Depends upon Satisfactory Solution of Water-heating Problem—Alternate Use of Range and Water-heater Suggested—Average Revenue That Must Be Received

"Profitableness of range load" is a different subject from "profitableness of range and water heater load." For the range load there is a pretty clear case. The water heater alone looks hopeless. The range and water heater combination presents a problem, but also supplies some of the means for its solution, and it is far from hopeless.

The cost of power delivered to the distribution system at the substation will average around $57 per kilowatt-year. From this point on the investment per customer and the operating cost will vary more or less with the class of service.

Range Loads

It is necessary to install 3 kw. in transformer capacity for single ranges, 5 kw. for two ranges, 7.5 kw. for four ranges and 1.5 kw. per range where more than four are connected to one transformer. In one instance a 25-kw. transformer having a connected load of fourteen ranges and ten 1-kw. water heaters showed a maximum load of 30 kw. for a period of twenty-five months and loads slightly in excess of normal for short periods each day, never exceeding twenty-five minutes.

In adding range load to the ordinary distribution system there is required an average additional investment in the distribution system of about $75 per range, making an annual investment cost of $9 per range. Distribution operating costs will average $6 per kilowatt and the commercial and general expense or customer costs will average $7.50 per customer.

Various group tests show that the average range contributes approximately 1.22 kw. to the total simultaneous demand on the distribution system. This average demand of 1.22 kw. is the result of diversity among cooking customers, but there is also a diversity between this demand and the demand of other classes of customers which we have not yet taken into account and which will further reduce the total simultaneous demand on the station.

Investigations indicate that the average range demand on the station is thus reduced from 0.6 kw. to 0.9 kw.

For the purpose of this discussion we will be conservative and assume 0.9 kw. On this basis the annual cost of service per range is:

Cost of power delivered at the sub-station ..	$51.30
Distribution investment cost	8.10
Distribution operating and maintenance	5.40
Customer costs	7.50
Total	$27.30

The average annual kilowatt-hour consumption per range is about 1,700 kw.h. and the cost per kw.h. is then 4.3 cents.

Water Heating Involved

The successful development of electric cooking is dependent upon some satisfactory solution of the water-heating problem. This problem, however, is fraught with no little difficulty, for water heating in proportion to the power required is a low-value service, and moreover, the load factor is such as to leave no room for dividing the cost with any other class of service. Naturally the greatest convenience to the customer is supplied by unlimited service, but it costs more to furnish such service than it is worth to the residence customer.

Several methods have been suggested for limiting the water-heater load. None of them has been very thoroughly tried out in practice, but the most effective and seemingly most workable method yet proposed is the installation of a double-throw switch separating the range and water-heater and alternating their use.

One Service and one Meter

It is assumed now that a universal residence service rate is in effect, and that we are delivering power for any and all purposes in the residence through one service and measuring through one meter, thereby reducing the investment and maintenance cost of services and meters. It is also assumed that the range and water heater are required to be connected for alternate use only. What average revenue must we receive from residences using lighting, cooking and water heating in order to pay the cost of service? The total simultaneous demand based on the average customer is:

	Kw.
Lighting	0.25
Cooking	0.9
Water heating	0.5
Total	1.65

The annual cost of service is then:

Cost of power delivered at sub-station	$94.05
Distribution investment cost—12 per cent of $125 × 1.65	24.75
Distribution operating and maintenance	9.90
Customer costs	7.50
Total annual cost	$136.20

Or a total of $11.35 per month. The average kilowatt-hour consumption is:

	Annual	Monthly
Lighting	250	21
Cooking	1,700	141
Water heating (20 hours per day)	7,200	600
Total	9,150	762

This is an average cost of 1½ cents per kilowatt-hour. Or if the water heater be connected ahead of the meter and charged at $4 per month, the lighting and cooking must pay the remaining $88.20 per year, or an average of 4.5 cents per kilowatt-hour.

The natural division of this cost based on average use is

	Per Month	Per Kw.h. Cents
Lighting and appliances	$2.25	9.00
Cooking	5.10	3.00
Water heating	4.00	0.55
Total and average	$11.35	1.5

(Concluded on page 39)

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*From a paper presented at the Northwest Electric Light Association Convention, Boise, Idaho, June 7 to 10, 1922

Electric Steam Generators and Their Application

Cost of Electric Energy for Steam Generation – One Kilowatt Hour Produces 3.1 Pounds of Steam — Three Phase Power Used—Superheater and Relay Systems

By P. S. GREGORY*

The production of steam by means of electric energy is not a new process, and the water resistance type of electric steam generator has been in use in Europe for some fifteen years, though in the majority of installations in small sizes only, of 1,000 kw. or less.

In general the cost of electric energy is such that it cannot be used commercially for the production of steam, but there are circumstances under which the conversion of electric energy into steam, even on a large scale, becomes economically feasible. The required conditions are a surplus amount of electric power, for which there is no other use at certain times, or a cheap supply of power. One or other of these conditions frequently exists in industrial plants. All manufacturers who purchase their power on a flat rate basis have at certain times in the day, or on certain days in the month, power available for which they have paid under their contract, but of which no use is made. The saving of coal which can be effected by the conversion of such surplus power into steam is a subject worthy of careful consideration.

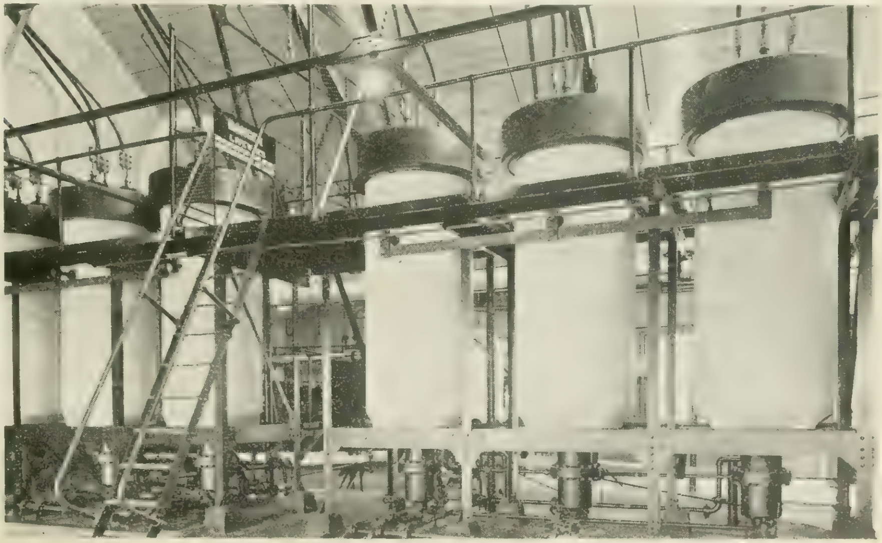
Relationship Between Electric Energy and Heat

The fundamental relationship between electric energy and heat energy as pertaining to the production of steam may be stated as follows: One kw.h. is equal to 3,412 British thermal units. In order to produce one pound of steam at a gauge pressure of 100 lb. per sq. in. from feed water having in initial temperature of 150° F., 1,070 B.t.u. are required. Therefore, if the conversion of electric energy into steam can be made at an efficiency of 97.5 per cent one kw.h. will produce 3.1 pounds of steam at the above conditions of temperature.

Under average conditions 1 pound of coal in a boiler will produce about 7.5 pounds of steam and therefore, the electric energy which is equivalent to one ton of coal is 15,000/3.1=4840 kw.h. This is equivalent to approximately 200 kw. for 24 hours, so that for each ton of coal per day to be replaced by electric energy, about 200 kw. of electric steam generator capacity is necessary. On the basis of 4,840 kw.h. being equivalent to one ton of coal, which is valued at say $8 under the boiler, the price which could be paid for electric energy would be 1.65 mils per kw.h. If therefore, a supply of power is available at a price not greater than 1.65 mils per kw.h. in a plant where coal costs $8 per ton or more, the production of steam by electric power is commercially feasible.

Electric Steam Generator Construction

The water resistance electric steam generator consists essentially of a closed pressure vessel to which is connected a source of water supply, and from which water may be drawn off at the bottom and steam at the top. In this vessel electric energy is made to flow through the water from an electrode in the form of a plate, or tube, to the shell of the shell of the vessel, or to the metallic inner lining. Alternating current energy is used at a pressure varying from 110 up to 12,000 volts. The generators are constructed for the use of 3-phase power, either by employing three elec-



View of electric steam generators in plant of Laurentide Co. Ltd., Grand Mere, Que.

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*Before American Electrochemical Society, Montreal, Sept., 1922 trodes in one vessel, or by the use of three vessels with one electrode in each, in which case the outer shells are connected together in star. In this type of generator there is no heating surface, the generation of steam taking place throughout the water, and as a consequence no portion of the apparatus is at a higher temperature than the temperature of the steam. This is a most important feature from the viewpoint of safety and continuity of operation, as can be readily appreciated.

The chief advantages of the water resistance type of steam generator over the metallic resistance type are freedom from electrical and mechanical troubles, ease of regulation and cheapness. This type of generator has recently been further developed and made applicable to conditions on this continent by Mr. F. T. Kaelin, chief engineer of the Shawinigan Water and Power Co. Units of Mr. Kaelin's design, manufactured by the Dominion Engineering Works, Limited, Lachine, Que., and the Electric Furnace Construction Company, Philadelphia, Pa., are in operation up to 25,000 kw. capacity. A full description of this type of generator is given in Mr. Kaelin's paper, read before the Montreal section of the Society of Chemical Industry, the Engineering Institute of Canada and the Canadian Institute of Mining and Metallurgy, on January 19, 1922. A low voltage type of water resistance generator was described at the fortieth general meeting of the American Electrochemical Society in October, 1921, by Messrs. Lidbury and Stamps.

Operation of Generator

In the operation of this type of generator the load or electrical input is dependent directly upon the area of electrode immersed in water, and inversely upon the resistance of the water. The variation of the water level or the area of immersion is affected by the operation of the valve in the feed water supply line. The resistance of water decreases with temperature, the relation being expressed by the formula.*

$$R = C \div \sqrt[5]{T^4}$$

in which R=ohms per cubic inch, T is the temperature in °C, and C is a constant having a value of about 42,000 for raw river water, and about 87,000 for condensate containing 25 per cent of make-up water.

The variation of the resistance of the water is effected by controlling the amount of water bled from the bottom of the generator. This water contains a comparatively high percentage of salts, and is therefore of a low resistance, so that an increase in the amount of water bled from the generator means on increase in the resistance of the remaining water and consequently a decrease in the load.

In actual operation it has been found that for ordinary fluctuations of load, such as are obtained in paper mills, a practical method of operation is to maintain a constant water level, and to vary the output of the generator by varying the resistance of the water by means of a bleeder valve.

Present Installation 150,000 kw.

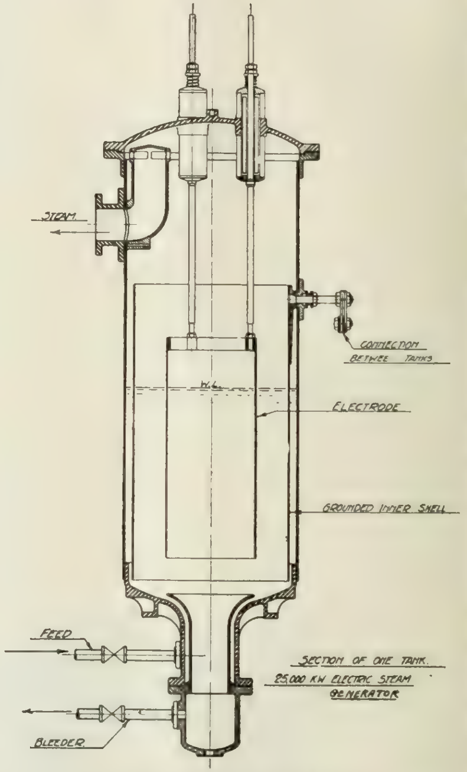
There are in operation in Canada and in the United States at the present time installations of electric steam generators totalling about 150,000 kw., which are for the most part installed in paper plants. One of these units is shown in the illustration below.

The accompanying diagrams illustrate the present development of the electric steam generator.

Fig. 1 shows a cross section of one of the three tanks of a 25,000 kw., 6,600-volt unit. The electrode is supported at three points to give mechanical stiffness. The feed water is deflected around the sides of the tank by the funnel shaped casting shown in the bottom of the tank. It is found in operation that this method improves the circulation of water in the generator, and consequently lessens the tendency to prime. The inner shells are separated from the main walls of the vessel, so that even in the event of an electric arc being established between the electrodes and this inner shell, and damaging the inner shell, no weakening of the outer wall would occur.

Use of Super-Heater

A super-heater may be used by means of which about 50° of super-heat may be given to the steam. The principle of the super-heater is as follows: Steam is generated at a pressure of 300 lb. and is fed into the super-heater, flowing outside of the super-heater tubes. It is then passed through a reducing valve, which reduces it to 150 lb. pressure, and it is fed into the super-heater again, passing inside the super-heater tubes and thence to the main steam line. The steam at 150 lb. pressure inside the tubes, being at 366° F., absorbs heat from the 300 lb. pressure steam outside the tubes, which is at a temperature of 420° F., and passes to the main steam line in a super-heated condition. The condensate from the super-heater is drained back into the boiler feed. In a super-heater designed to super-heat 20,000 lb. of steam per hour at 150 lb. pressure from 2 per cent moisture to 50° of super-heat the total heat to be transfered was 616,000 B.ut. per hour. The mean temperature difference was 30° F., and the heat transferred per square foot of heating surface per degree temperature dif-



Section of 25,000 Kw. Electric Steam generator ference was 68.5 B.t.u. per hour. The electrical energy required at 90 per cent efficiency was 180 kw. The advantage of this type of super-heater is that the amount of superheat produced is constant, and that there is no overheating of the super-heater in case only a small amount of steam is being drawn from the generator.

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*The Generation of Steam by Electricity by F. T. Kaelin.

Pressure Regulating Control

Generators are also fitted with a pressure regulating system of control, so that the operation is automatic and no attendant is required. The principle of operation is as follows:

Under normal running conditions the pressure regulator valve on the feed line, which is actuated by the pressure in the generator is open. If the steam consumption is reduced so that the steam supply exceeds the demand, the pressure will rise, and owing to the operation of the pressure regulator valve in the feed control, the amount of water fed to the generator will be reduced, and the water level in the generator will gradually sink. This may continue until a water level is reached at which the float valve opens in the bleeder line, allowing a quantity of impure high conductivity water to be drawn off from the bottom of the tank. This will have the effect of increasing the resistance of the remaining water as well as still further reducing the water level and therefore of cutting down the flow of current until the supply of steam becomes only equal to the demand, and the pressure regulator valve is operated by the reduction in pressure and opens allowing more water to flow into the generator, gradually raising the water level.

The float valve in the bleeder line is closed by the rising water level, which after one or more cycles of operation will finally attain a position such that, for the particular conductivity of the water in the generator, will produce a steam supply equal to the demand.

If, on the other hand, the demand for steam exceeds the supply, the pressure in the generator will drop, and the pressure regulator valve in the feed line will therefore be opened wide and allow more water to flow into the generator, raising the water level, and consequently increasing the steam supply until the pressure rises sufficiently to close slightly the pressure regulating valve, adjusting the inflow of water to the outflow of steam.

The possibility of the water level rising too high in the generator is avoided by the high level float valve in in the feed line, which shuts off the water supply when the water level reaches the top of the electrodes.

A generator fitted with this system of automatic control, has been designed to supply low pressure steam for the heating of buildings. As the heating system is a closed system, the condensate being returned to the generator, it was not necessary to install a bleeder control valve on the heating generator.

Application of Relay System

The development of electric relay systems for the control of steam generators has kept pace with the other developments.

In the operation of the water resistance steam generator the ordinary bugbear of low water has no terrors, but should an electric arc become established between one of the electrodes and the wall of the vessel, a dangerous condition would at once arise. This possible source of trouble has been avoided in two ways—by the installation of an inner protective shell separated from the outer wall by an inch or more, and by the development of a potential balance relay system by means of which should a ground occur on any one of the phases, the main circuit breaker is immediately opened. The opening of the circuit breaker does not depend upon the load on the generator, but only upon the potential balance, and the relay will function equally well from no load to full load, which is a very important consideration.

The complete electric relay system installer in connection with one of the larger units is illustrated in Fig. 4. The relays consist of the ordinary overload relays, the potential balance ground protection relays and an emergency hand-operated relay trip.

In order to make possible the application of the electric steam generator under conditions where a fixed amount of power is purchased, which is not all utilized in manufacturing operations, a relay system has been developed which will govern a total amount of power taken by the consumer, and will insure that all power not otherwise required will be utilized in the electric generator.

The principle of operation consists in cutting in or out the feed water supply to the generator by means of the overload relays, which are operated by the total power consumed. The relays are so arranged that once the feed water is cut out it will not be cut in again until the total demand has been reduced some 10 per cent below the contract amount. The shape of load curve obtained with a generator controlled by this type of relay system is therefore, saw-toothed, and the relays can be so designed that the amount of available energy which is unused is less than 5 per cent of the total energy purchased.

In conclusion it must be pointed out that the water resistance type of electric steam generator has now been developed to such a point that there is on the market today an apparatus suitable for the conversion of surplus electric energy into steam under almost any given conditions. Furthermore, in cases where power is cheap, or where fuel is expensive, or in special industrial processes, the electric steam generator can economically replace the coal-fired boiler.

Are Range and Water Heater Loads Profitable?

(Concluded from page 36)

With our present average load factors this is what it costs, but the cost per kilowatt-hour goes down nearly in proportion to the increase in the load factor, and utility companies can therefore offer very attractive inducements for increased load factor of residence business. The addition of cooking load to any ordinary central-station system will increase the load factor, and the value of the service will guarantee an average of 3 cents per kilowatt-hour. It is, therefore, profitable business to take on, even when accompanied by that evil but necessary companion, the water heater.

Two golden opportunities are open, however, for increased profits: Cut down costs by adopting the one-meter universal residence service plan. Deliver more service at the same expense by increasing the customer's load factor.

First Coal Mine Figures

First reports from the United States coal mines indicate a healthy resumption of production, although both anthracite and bituminous for August were still considerably below normal figures. The output of bituminous coal in August totaled 25,800,000 tons compared with 7,000,000 tons in July, and 34,548,000 tons in August, 1921. Anthracite production, 161,000 tons, showed no substantial change from the preceding months, since mining was not resumed until September. By-product coke production, however, suffered a decline, although beehive increased. The by-product production figures for August, 1922 July, 1922, and August, 1921, respectively are: 1,794,000 tons, 2,486,000 tons, 1,383,000 tons.

Seven-cent Fare Cuts Down St. Thomas Street Railway Deficit

The first month's operation of the St. Thomas city street cars with the seven-cent fare in vogue has proven highly satisfactory to the department and the experiment will be continued for another month at least, Manager Charles Johns reported to the City Council recently. The total operating deficit for the period from August 26 to September 26 was $116.03, the smallest monthly deficit on record. The deficit for August of this year with the straight five-cent fare charged, was nearly $600, while the deficit in September, 1921, was nearly $1,000.

In addition, the operation under the increased fare showed an increase in passengers carried per car mile. A total of 42,770 passengers were carried during the last period, as against 59,064 in September 1921. The figures presented to the council did not include the patronage for Wednesday, September 26, when nearly 4,000 fares were registered.

Deficit for Year Reduced

The operating deficit for the first nine months of the year was approximately $5,000. The operating deficit last year was nearly $20,000.

The receipts for the August 26 to September 26 period totalled $2,455.81 and expenditures $2,571.84. The power bill for the preceding period was $395.98; watchmen's wages, $135.59; operating wages, $997.27; barn wages, $333.90; track wages, $166.38; line wages, $59.80; salaries, $198.33.

Cash fares for the period were $1,274.01 as against $1,092.62 in September 1921, an increase of $181.39; ticket sales were $1,176.75 as against $1,492 last year, a decrease of $316.25.

Car Mile Cost Comparisons

The cost per car mile of operating the cars during the 1922 August period was 23.3 cents as against 22.9 cents during the September period. The cost per passenger per mile was 8.8 cents in August as against 8.4 in September; the revenue per car mile, 13.9 in August in comparison to 15.7 in September and the passengers carried per car mile, 2.65 in August as against 2.74 in September. The total number of car miles operated during the September period was 15,600.

Bus Question Again Deferred

The question of supplementing the street car service with motor buses was again briefly discussed at the meeting but decision postponed, the consensus of opinion being that the seven-cent fare operation had not had a fair trial and no further changes should be made until the new system had been fully tested.

Manager Johns reported that a salesman for a bus manufacturing firm had been in the city and had claimed that their bus could be operated at 15 cents per car mile.

Come to the Convention, Nov. 13 and 14.

Electrification of Stave Lake Railway

The British Columbia Electric Ry. Co., is electrifying its Stave Lake railway which connects the Stave Lake power plant with the C.P.R., at Ruskin, B.C. The line is about 6 miles long, and besides being used in the past for hauling logs from the lake above, will be used extensively for hauling gravel during the building of the new dam at the power plant. Power will be supplied from one sub-station, containing 3 transformers and one 400 kw. motor generator set. Electric locomotives from the company's interurban system will be used and the 2 steam locomotives will be sold. Passenger service is now given by a gasoline car. The company's plan calls for a second development, lower down the river than the first plant, in a few years, and when that is proceeded with the present railway will be submerged. The work, therefore, is of a more or less temporary nature.

New Portable Measuring Instrument

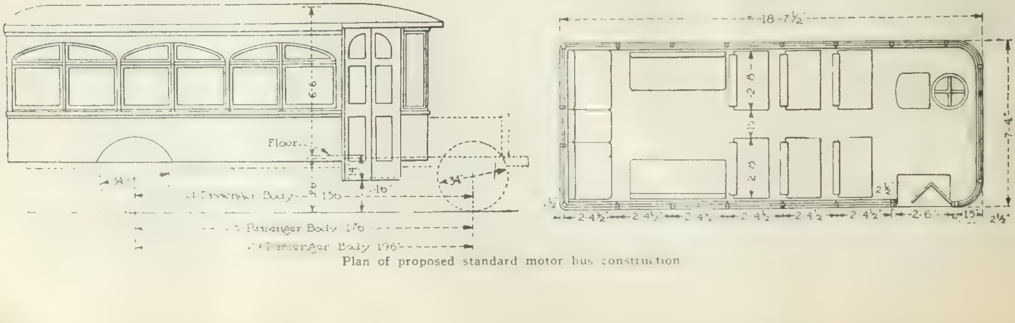
Portable ammeters and voltmeters of a new type, of which compactness, ruggedness, simplicity of construction, and accuracy are claimed as important features, have been added to the line of instruments made by the Westinghouse Electric & Manufacturing Company. The instruments, known as Type PX-3, are direct reading meters for general testing purposes. The field of their application is wide, including central station analysis tests; trade school, high school, and college equipment tests; and battery apparatus tests. They are particularly well suited for automobile and battery testing. A set of six of these instruments is not as bulky to carry as one ordinary large portable instrument.

Standard Motor Bus Construction Proposed

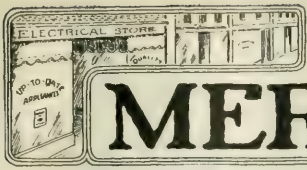
Tentative plans for standard motor bus construction have been drawn up by the American Electric Railway Association. Motors are preferably of either poppet or sleeve valve type, with maximum speed not to exceed 1,300 r.p.m. This development is felt to mark a definite effort on the part of street railways to enter the bus field. The proposed dimensions are given in the accompanying table:

Number of passengers	21	25	29
Wheelbase (inches)	156	176	196
Engine (horsepower)	30	40	50
Tread, front and rear (inches)	66	66	66
Capacity of rear (tons)	2	2½	3
Braking surface (sq. in.)	150	175	200
Approx. maximum weight (lb.)	4,500	5,000	5,500

Other recommendations are: (a) Low-hung type of chassis frame with a maximum frame height of 26 inches, preferaby lower. (b) Spring suspension. (c) Engine, preferably of either poppet or sleeve valve type, with maximum speed not to exceed 1,300 r.p.m. (d) Gear ratio not to be less than 7 to 1, and not more than 12 to 1. (e) Metal plate or spoke wheels. (f) 34-inch solid or semi-solid tires; pneumatics where low floor heights not desired.



Plan of proposed standard motor bus construction



BETTER MERCHANDISING

All Together

Some one has defined success as "Concentration plus Opportunity."

The success of the present sales campaign on Electric Heaters bears this out.

But in one important respect the electrical industry differs from most—there is ***no need to wait*** for the opportunity.

The opportunity is always present.

Then, all that is needed is ***concentration.***

One thing at a time—Electric Heaters today; Washing Machines in November; an Electrical Christmas in December; Good Lighting in January, and so on.

The opportunity is always here; let's grasp it, ***together.***

All together, but—one thing at a time!

The Emancipation of Washboard Slaves

A Wonderful Opportunitv for the Electric Merchant—90 per cent. of Our Housewives Still Under the Yoke—A Few "How-I-did-its" and Several Rounds of Ammunition for Future Use

There are several factors that make the electric washing machine field attractive to the merchandiser who pushes this end of his business. In the first place, a large amount of money is being spent by manufacturers in the education of the housewife to its advantages. In the second, there are plenty of advertising and display helps available, and in the third, a steady turnover of machines means a constant inflow of profit.

The only trouble is that turnover has not been as great, in many cases, as it should have been—the necessary punch has been lacking. The fault is partly in the sales methods adopted, and it is the purpose of this article to outline some sales plans that have proved successful.

Knocking Does Not Sell Machines

At the outset of the discussion, it seems that a few general remarks on the subject of "knocking" will not be out of place. This habit is a prevalent one—almost any electrical show or exhibition demonstrates the fact—that it always works as a boomerang. Right now there are over 100 manufacturers putting machines on the market. These are all ramifications of either the cylinder, oscillating, dolly or suction type of washer, and the prospect is likely to become bewildered in making a choice. When he hears the cylinder type man lambasting the oscillator, the man selling the suction type panning the dolly type, and so on, he tends to think there is something wrong with all of them and either does not buy or is only sold with great difficulty and waste of time.

Tell Them What the Machine Will Do

The time that salesmen spend throwing hammers at each other's machines should be spent in telling what the machine will do. The buyer is interested in that point and when he is told how well the machine washes clothes and at what saving of backaches and labor it gives him a desire for possession. This applies to women especially—they are not mechanics and never will be and the mechanical features of one machine as compared with any other machine, do not particularly interest them. What they want to know is "Will this machine save me anything in time and labor and will it wash my clothes clean?" The woman who believes that a machine will do that for her is sold. She is blissfully ignorant of, and does not want to know anything about, the motor, or the wonderful metal in the tub or the phosphor-bronze gears. Those points may be used with her husband, or told her after she is sold, but it is a mistake to expect that she is going to be impressed by them. She is, of course, very much interested in its ease of operation and safety features and these should be used to arouse her interest.

Tom Jones Never Loses A Chance

The dealer should be working all the time to lay the foundation for future sales. Washing machines require as much sales effort as anything he handles, but adequate preparatory work makes it easier.

Let us suppose that Tom Jones keeps his washing machine well up to the front of the store. It has the best place there is, lots of room to itself, right where everyone coming in has to pass by. That is one point in the game . The next is that he never misses a chance to show off its good points. Mrs Prospect perhaps pauses before the door to take a look at the machine. Jones is right on the job with some such remark as "That machine is a pleasing design, isn't it" and proceeds to put it through its paces for her benefit. Missionary work, of course, but it pays with the woman who has been breaking her back over a washboard.

Demonstration Procedure

Jones finds that many of these customers come back some time or other, generally with their husbands, and the machine is quite evidently the main object of their visit. He then starts out to sell the machine with all his might, and he follows a definite plan.

The first step, of course, is to arouse the prospect's interest. The general procedure may be set down as follows:

1. Machine closed, Jones remarked on beauty of appearance.
2. Advances to machine, opens, explains general features and washing principle.
3. Demonstrates wringer, contrasts with hand method.
4. Explains safety features.
5. Tells prospect about easy operation of motor.
6. Speaks of very low cost of operation.

The above are, of course, only the initial steps.

What should follow is the answer to the question "Will this machine save me anything in time and labor and will it wash my clothes clean?" That answer is where the selling punch is put into the argument, and makes all the difference whether the prospect goes away with a vague idea that she would like an electric washing machine, or buys one on the spot.

Keep the Prospect Saying "Yes"

All through the sales argument the dealer must keep in mind the psychological effect of having his prospect say "yes" throughout the period. As has been remarked by another writer "Trying to have your prospect say "yes" at the end of your talk, and all at once, can be likened to handing him a large bundle of lath and asking him to break them all at once. He can't, and you cannot make him. But you can easily have him, or her, take those laths one at a time and break them."

The process should be started by asking the prospect a few questions that cannot very well be answered except by yes. Show him or her the machine and say "That's a real compact little machine."—These little questions should be used all the way through,—not frequently enough to make your purpose apparent, but enough to keep your prospect saying yes. Here are a few instances:—"That saves a lot of work doesn't it. "The mechanism is very simple, isn't it", "That wringer is handy, isn't it?" and so on. A veteran salesman says that his method is to work the 'yes' question all through, at the same time figuring out what aspect of the electric washer question most appeals to the prospect. He then sums up his argument by discussing that question and concludes by a question calculated to receive an affirmative answer, such as—"We're putting on a fine installment plan, don't you think?

By the time the end has been reached, and the prospect has to say the 'yes' that means business, he or she is already half committed. The habit of saying 'yes' to the salesman has been formed and one more comes without a great effort.

The Cost of Washing

The greater number of machines are sold on the installment plan and the dealer can capitalize on the popularity of this practice. This is a case where figures count. If an installment plan is made a definite selling point, a certain payment system such as the payment of $10.00 per month, should be stressed. The cost of doing washing by the old method can be worked in here, and it may be shown that the machine pays for itself. One way of doing this is to draw up a table of what it costs to do the weekly washing by the ordinary method and compare it with the installment payments. Here is such a table:—

Clothes Washing Expense Hand Method

Washerwoman	$2.50
Carfare	.15
Three meals	1.20
Soap	.15
Total cost, weekly	$4.00
Total cost, one year	$208.00

Electric Method

Electric current	$0.01
Soap	.15
Total cost, weekly	$0.16
Total cost, one year	$8.32
Saving in one year	$199.68

Thus it is easily shown that the machine pays for itself in one year.

It may happen that in presenting an argument such as the foregoing, the salesman will find that his prospect objects to the fact that no figures for interest and depreciation are shown. The counter to such an objection is: You must remember that if we were to work it out to the last cent, the depreciation and interest on the hand equipment (which wears out very quickly) would also have to be taken into account. However, here are the figures, showing the items you mention.

Cost of operation	$8.32
Interest on $200.00	12.00
Depreciation (say 10%)	20.00
Total	$40.32
Gross saving	$208.00
Total expense	40.32
Net saving	$157.68

So you will see that any way you figure it, you practically pay for the machine the first year.

Pays for itself in one year

The time saved is another point that must not be overlooked. One user has estimated that an electric washer adds 19½ eight hour days to the housewife's year . This is surely a point worth telling her about.

Opportunity in the Business

The stupendous growth that has taken place in the washing machine industry since it started in 1909 is sufficient evidence of the opportunities that exist. In that year the total business in Canada and the United States amounted approximately to 225,000—in 1920 some 700,000 machines were sold, representing an expenditure of $85,000,000.

The cry of saturation is disposed of at once by a consideration of the figures—of available prospects for electric washing machines less than 10 per cent have been sold. Out of 100 women that enter your store only ten have washers—the remaining 90 are waiting to be sold.

The public is becoming educated to the fact that electric appliances are vital necessities in the home—the final clinching of the argument is left to the dealer, and the man who uses his head, grasps the situation and pushes the sale of his machines by up-to-date methods is reaping a rich harvest.

Testimonials

There is nothing more convincing than the testimony of a woman who has bought and used a machine.

A very successful dealer recently told the writer that he made a practice of getting short letters from his customers. These he would show to prospects who seemed at all doubtful of the merits of electric machines. One of his letters was worded like this:

Dear Mr. Jones:

My new machine is working perfectly and is much more satisfactory than I expected. What I notice most is that it relieves me of the hardest of the work, the drudgery of it. I actually do not dread a washing day, and as a matter of fact would rather do it than the upstairs work. I still have a woman come in, but instead of having her spend the day over the wash tub I handle that part of the work in about two hours myself, and thus leave her the whole day for cleaning and polishing the upstairs."

Yours truly
Mary S. Mason

It doesn't really matter whether the prospect knows this customer or not—the psychological effect is there—the direct evidence that the machine satisfies the needs of another woman whose circumstances are much the same as her own.

Demonstration

Seeing is believing. There can be no question that the best evidence of the value of washing machines is clean, white clothes. The average housewife doubts the ability of any machine to take the place of the wash-board. Therefore she must be "shown". The store is the easiest place to attract her attention first but the laundry in the home is the logical place to clinch the sale. The salesman must never feel that, because he has failed to sell from the store, he has lost the sale. He still has his best card to play. He must now bend his efforts towards getting the consent of his prospect to try out the machine in her own home. Once there, the odds are in favor of it never coming out. This is especially true if the dealer is careful to see that proper instruction is given. A woman demonstrator is best for this. A dealer friend tells us he employs a woman demonstrator entirely to go out to the homes. She has the housewife's viewpoint; can answer her questions and appreciate her difficulties.

While the washing is actually under way is a fine opportunity to win the house-wife over. Here she is, free to talk and rest while the washing is being done. It's what might be called "a grand and glorious feeling," and the wise saleswoman takes fullest advantage of it to ingratiate herself in the lady's good graces.

One Dealer's Experience

This is the story of an electrical store that had an income of about $125,000 last year, and is showing an increase for every month this year. On an average, one washing machine a day is sold—the manager's ultimate aim is 100 washing machines a month. A good deal of this firm's success results from the manager's policy. Here is an outline of it in his own words:—

"I believe in selling on durability and service and in taking great pains to make the customer understand thoroughly just what the machine does, how to operate it, what it costs and how it is made. Customers sometimes tell me that they enjoy trading here because everything is explained so clearly. If a customer is familiar with the construction and operation of the machine she buys, she is not likely to become dissatisfied.

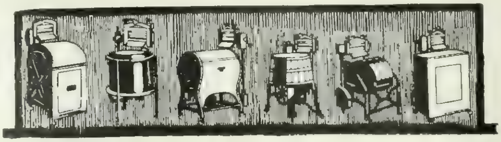
Make sure the customer understands the operaton of the machine

"We make a point of demonstrating every machine right here in the shop. Then our lady demonstrator goes out to the home and sees that it is properly installed and that everything is in perfect condition. She makes sure that the customer understands the operation of the machine.

"I never let our service department slacken off. Besides answering calls, the service man drops around and looks at all our machines in the neighborhood. This sort of service pays.

"We have very little trouble with dissatisfied customers, but when a complaint does come in, I always go out to the home myself and investigate the cause of the trouble. And we always refund the customer's money if she wishes it, or give her other goods of equal value.

"There is nothing spectacular about our methods, but we are selling washing machines and other appliances while the other fellow is standing still, and the reason is that we keep our customers sold and make them our best advertisers."



"Bringing Home the Bacon"

Brief Outline of Three Actual Campaigns that Gave Excellent Financial Results— Not Difficult to Get Public's Attention

Using Radio Set for Prize in Competition

The lull in summer business set the manager of one up-to-date electrical store devising ways and means of getting more sales on his books. Washing machines had been particularly slow, and he concentrated on them.

The result of his planning was the holding of a children's contest. Advertisements were run in the local papers, offering the choice of a good radio set or a portable lamp to the boy or girl who sent in the largest number of persons to witness a washing machine demonstration. The advertisements were illustrated by cuts of the prizes and later, as the scheme progressed, the prizes were shown in the store windows.

It was deemed advisable to run the advertisements some days in advance of the opening of the contest, which extended over two weeks. One of the ads. was as follows:—

> PRIZE CONTEST
>
> **Radio Set Or Portable Lamp**
> **Free To Some Boy Or Girl**
>
> What boy or girl that is reading this is going to win this long distance radio set, or the beautiful portable lamp? It may be you—everyone has an equal chance, the winner is the one who hustles.
>
> All you have to do is to distribute admission tickets. These tickets admit people to demonstrations of the—Electric Clothes Washer. You have nothing to sell, just give the tickets to all your relations and neighbors and have them come in and vote for you.
>
> The demonstration of the washer will show how easy it is to do the weekly washing in a few minutes. Dirty clothes will be washed white and clean before your eyes.
>
> COME IN AND GET YOUR TICKETS!

Interest was high, right from the start. After school, on the first day the ad. appeared, the boys and girls came down in droves. Each was registered at the store and given a quantity of tickets to distribute. It was explained to them that to get credit for the tickets, each one had to be handed in to a salesman by a person who came in to witness a demonstration.

The actual demonstration was very carefully gotten up. An experienced lady demonstrator was used, and the whole was arranged in the manner of a pantomine. Toward the last of the two-week period the names of the leading contestants were printed in the daily paper, together with the standing of each.

Names of prospects were secured in large numbers and the personal canvass which followed resulted in the sale of a number of washers. Results from the publicity are still coming in.

Co-operative Newspaper Advertising

There is one prominent town in Ontario where the business is pretty well distributed among four dealers. These four are progressive, believe in fair competition, and are willing to co-operate.

It occurred to one of them that there were not enough washing machines out in their territory. He broached the matter to his brother dealers and as a result they got together and used a liberal space, which dealt with washers only, in the local newspaper. The following head was used for the advertisement:—

> AVOID WASH DAY DRUDGERY
> —DO IT ELECTRICALLY—
>
> **The following firms are in a position to furnish you a good washing machine to do the work.**

Zinc cuts were obtained that showed the old and new methods of washing; these were worked in underneath the heading. The "Old Way" cut showed a woman bending over a steaming tub of suds and bearing an extremely tired and worried look on her face. The other showed an electric washing machine doing the work while a woman was seated at ease in a rocking chair reading a book. All the names were signed below, giving the same prominence to each.

The page was run weekly and enquiries and sales soon began to come in. These dealers claim that by grouping their advertisements a much greater effect was obtained. The average reader was impressed by the fact that a whole page was given to washing machines, much more than if the same number of small advertisements had been scattered through the paper. The result has been that washing machines are being placed in greater numbers than ever before, each dealer, of course, following up his advertisement with intensive selling on his own account.

Featured an Installment Plan

The wide awake manager of one large western store found himself up against a power shortage that cut down the sale of ranges, heaters and other large current consuming devices. To keep up his sales totals was the problem, and he solved it by concentrating on washing machines.

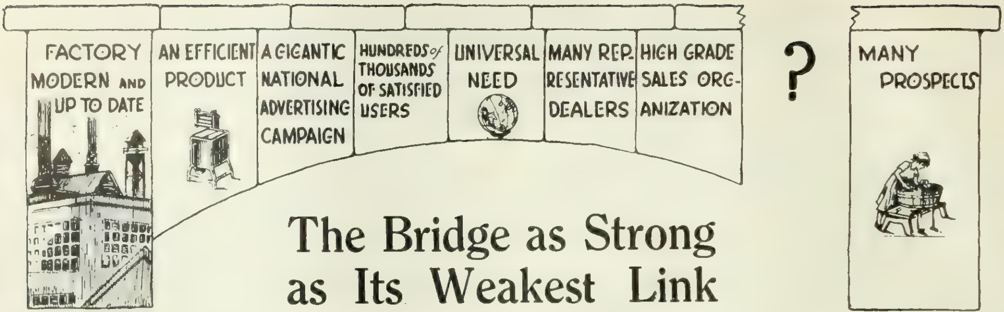
He looked over the washer market, and selected one type of machine which he found had sold very well in his neighborhood. A consultation with his supply house resulted in their co-operation, and he was able to count on their assistance all through the campaign.

A popular priced installment plan was then worked out. He was able to offer a price of $98.00 on this machine, and sell it on a $10.00 cash payment with the balance in twelve monthly installments.

These were the features of the campaign:—

(1) Plenty of snappy advertising.
(2) Popular prices.
(3) Easy terms.
(4) Intensive selling.

The result of the campaign was the sale of three hundred washers in one month. The installment plan outlined above proved a great drawing card, and a surprising number of washers was placed in homes where it is generally considered difficult to sell a machine.


FACTORY MODERN AND UP TO DATE
AN EFFICIENT PRODUCT
A GIGANTIC NATIONAL ADVERTISING CAMPAIGN
HUNDREDS of THOUSANDS OF SATISFIED USERS
UNIVERSAL NEED
MANY REP. RESENTATIVE DEALERS
HIGH GRADE SALES ORG-ANIZATION
?
MANY PROSPECTS

The Bridge as Strong as Its Weakest Link

Home Demonstrations an Essential Factor in Bridging the Chasm Between Factory and Home

What is the situation in the washing machine field today?

We find that there are plenty of manufacturers in the field.

They have reduced washing machine manufacture to a science. The production end of the game is pretty nearly 100 per cent perfect.

How about the machines they produce? The machines do the work they are claimed to do. They save time and effort. They are well built. There are thousands of satisfied users of electric washing machines. These are a testimonial to the efficiency of the product. But there are tens of thousands waiting to be sold.

Why are only 10 per cent of the people who live in wired homes equipped with electric washing machines?

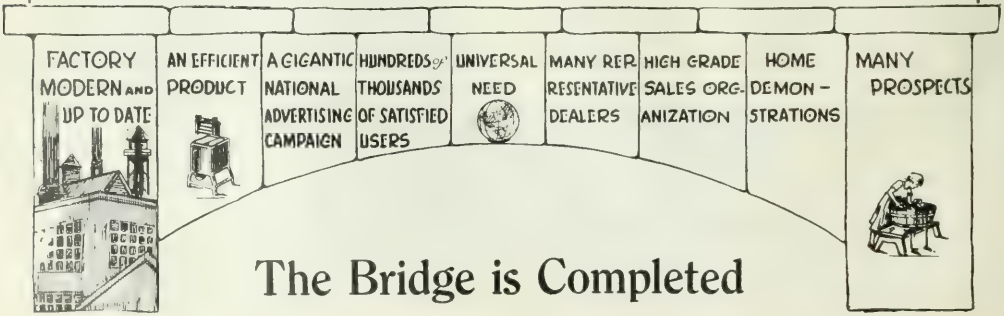
The answer is given in the illustrations. Look at the top one. The last link between the sales force and the prospect is missing. There is something further needed to connect the lady at the old-fashioned wash-tub with the high grade sales' organization. She has seen the advertising and the exhibitions but she is a little bit skeptical It is a lot of money for her to spend. And then it might not do the work. That would be awful.

What she needs is to be shown. Look at the bottom drawing. The bridge is complete. Somebody gave her a home demonstration. The lady at the wash-tub is connected with the high grade sales' organization. She may be a timid woman or a very busy one. The salesman is going to do her washing for her in her own home. She is going to get a chance to examine the machine and appraise it without the restraint she feels is public.

She is a live prospect, but hitherto she has been neglected. The sales man is going to sell her

The situation in the washing machine field is O.K. The scientific manufacture, efficient product and material advertising are not wasted. The home demonstration has come in, in its proper place.

The bridge is completed!


FACTORY MODERN AND UP TO DATE
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UNIVERSAL NEED
MANY REP. RESENTATIVE DEALERS
HIGH GRADE SALES ORG-ANIZATION
HOME DEMON-STRATIONS
MANY PROSPECTS

The Bridge is Completed

The Contractor's Second Best Method of Estimating Wiring Costs

By J. W. COLLINS, E.E.
Secretary Chicago Electrical Contractors' Association

When a paper is written on a subject it is usually intended to convey the writer's idea of the best for the subject. I am disregarding this theory and will state that I am going to discuss what I call the second best on the subject.

The best method of estimating wiring costs is by the unit of material and labor cost system. This system should apply to every wiring job. You know that as well as I do. We also know, however, that the contractors will not use it on certain classes of work, namely, home and apartment wiring. On this class of construction they insist on estimating on the outlet count basis, which is about as correct as establishing the price of a coat by a button count.

Counting outlets as the sole basis of estimate not only affects the construction of the job, but is one of the greatest hindrances to the progress of the use of electricity in the home. This can best be proven by an analysis of a home wiring job.

I claim there are four distinct items of construction in home wiring that can be scheduled and made uniform in price to the extent that they are so constant in cost that there is very little variance from the unit of labor and material method. These units may be designated as Service—Meters—Circuits and Outlets. We will take them up in the order named.

Service.—In each locality a definite system of servicing a building is established by an inspection body or central station. Rules of service are usually such as define exact locations for service entrance and service switch for each type of building. Such being the case we may properly estimate a service cost for each type of building and sizes of service from the smallest allowable to the largest anticipated for each type.

Meters.—The same influence governs the arrangement of meters and therefore a proper constant cost may be arrived at.

Circuits.—The run from cutouts to first outlet on each floor are invariably of the same construction and quantity of material, so we may estimate circuits from one to maximum for each floor and arrive at a very accurate uniform cost.

Outlets.—You will admit we have covered considerable ground and expended some time and material up to this point, which is not considered in the flat outlet estimating system at all. Now we will figure outlets for just what they are, simple loops of material from one to the other and can be properly averaged in cost.

Let us apply the outlet counting system of estimating to two jobs of the same type in comparison with the four unit system as to cost finding and the effect of each system as to its influence on increasing the further use of electrical home appliances.

A two-storey residence wired in rigid conduit having a specification as follows: Eight ceiling outlets for thirteen lights, two brackets for two lights, one wall outlet for one light and two wall switches. We have a total of sixteen lights.

Estimating this job by Chicago conditions we find the service extends from second floor ceiling joist to three feet or less within the basement. Our schedule for the given number of lights and type of buildings would show a 25-foot service of two fourteen wires in one-half inch conduit. Next comes our meter-loops and meter-board which are standard in design and material, and, therefore, a scheduled cost per meter would apply. Now we come to the circuits and that portion of the cutout box applying to each circuit. Circuits run from the cutout box to first outlet on each floor and are so uniform in construction that we may properly cost this portion of the job by schedule.

We have traveled some distance to this point and we haven't touched on what most contractors constitute as being the only consideration in a job.

Outlets are simple loops from one to the other and should only be considered as a unit of the estimate. We can strike a very fair average of material and labor for all classes of outlets and fall little short of a perfect estimate.

Getting back to the job under consideration we will establish a cost schedule, the figures being accurate only for comparison, and attempt to show the merit of the four-unit estimate.

Cost Schedule

2 storey No. 14—2 wire service	$ 7.50
Meter loop (Conduit and Appleton fitting)	2.50
1-2 storey circuit (loop out for first floor)	6.50
Ceiling outlets	2.50
Bracket outlets	2.25
Single pole switch	3.00
Base receptacle	3.30

Our job as it stands estimates as follows:

Service	$ 7.50
Meter	2.50
Circuit	6.50
8 Ceiling outlets	16.40
2 Bracket outlets	4.50
1 Base receptacle	3.30
2 single pole switches	6.00
Total cost	$46.70

We must admit our house is not properly wired under this specification and we will now estimate a complete or at least a more elaborate installation by the four-unit method and by the outlet count method.

Let us add 6 ceiling outlets, 2 brackets, 3 base receptacles, and 3 switches, not an unusual sale.

Using our four-unit method we find no increase in service cost, no increase in meter cost and but a slight circuit increase, our estimate now stands as follows:

Service	$ 7.50
Meter	2.50
Twin-circuit	8.50
14 Ceiling outlets	28.70
4 Brackets	9.00
4 Base receptacles	13.20
5 S. P. switches	15.00
Total cost	$84.40

Now the outlet count system assuming the contractor correctly guessed the cost of our first specification, we would have a cost of $3.59 per outlet. Adding our additional specification we find the job cost as $96.93.

In this case you will say, "very good for the contractor and not so good for the customer." We have overcharged the customer ninety cents plus our overhead and profit and undoubtedly lose the sale of several of the outlets, which means the manufacturer, jobber, central station and fixture industry all lose with him.

Suppose we reverse the schedules and assume the outlet counting contractor based his outlet figures on the second specification and was called to estimate the first specification.

We find our cost per outlet in the second specification is $3.12 per outlet, our first specification being 13 outlets we find a cost of $40.56. If our four-unit system is correct the contractor has made an unconscious contribution of $6.14, for which he receives no honorary mention. Our jobbers may come to the conclusion that we are getting an abundance of the first specification jobs, from the appearance of our accounts on their books.

It is not fair to guess on an estimate when so little time and effort is necessary to get a proper estimate. I know the four-unit system will prove its value, because I have had personal contact with a firm that has depended entirely on the system to estimate as high as fifteen hundred jobs completed per year and the variance from job to job was so slight in comparison with actual completed costs that it would seem impossible to arrive at a system more accurate.

The Development of Electric Ironing

About the year 1890 inventors began working on the problem of developing electrically heated appliances of various kinds. Flat or sad irons then in use were the same as had been in use for hundreds of years. The natural thing was to take one of these old irons, cut a hole in it, insert an electrical resistance coil and attach an electrical wire of some sort to this coil to make the connection with the lamp socket. One of the first electric irons made was fashioned along these lines. It weighed six pounds and consumed about 400 watts. Gradually improvements were made over the older types. A wooden handle was used instead of a metal one making it unnecessary to use a cloth protector for the hand. While the heater cord was still permanently attached to the iron, a spring was added to protect it and keep it from becoming kinked at the point of support so as to avoid quick breakage due to the wear of service. Another big step forward and one looking toward increasing the beauty and attractiveness of the flat iron was nickel-plating the spring, the handle strap, the top casting and the middle casting. The bottom casting was not originally nickel-plated but was simply polished and then treated with a hot solution of beeswax to make it brown and prevent quick rusting.

The electric iron of to-day has progressed far from those first crude specimens. The cord has now become detachable, connection being made by means of a plug which can be removed from the iron at any time. The shell or cover of the electric iron is now usually pressed steel and it is very highly nickel-plated to give an attractive appearance to the iron. Heating elements have also been improved and their position in the iron body has been designed to give the greatest heat at the point where it is most needed. Also the electric iron of to-day can easily be taken apart by the electrical contractor-dealer for making repairs.—Northern Electric Bulletin.

Features of a Campaign that Placed 600 Washers

Two Years of Plugging but then Results Came In

A certain electrical merchandising concern has recently sold over 600 electric washers—this in a city of 35,000.

The manager of this store states that it took a long time to produce results, but when they did start to come in, they exceeded expectations.

The washing machine campaign included a house to house canvass that was carried out until every possible prospect had been seen. The canvasser was considered to be a pioneer, doing the spade work for future sales. A big percentage of the population were factory workers, and the outlay of $150.00 or so was a big matter to them, even on an easy payment plan. It had to be discussed pro and con, months perhaps being required to arrive at a decision.

After this initial canvass, the work was by no means allowed to drop. A complete card index was made, and the more promising prospects segregated. The cards were segregated into five files; the main file, indexed alphabetically; the follow-up file, indexed according to date; the "sold" file (for future service calls or to interest in other electric appliances); the "sold to competitors" file; and the "not interested" file (usually three calls to determine placement therein). The cards, were so arranged that a lot of miscellaneous information about the state of mind of the prospect could be written down, which was of great use for future reference and particularly when making the next call. The date of call or communication by telephone was always written down in one column and at the conclusion of the call the date for the follow-up call was written in the column for the purpose and then the card put in the follow-up file under the follow-up date noted. Thus the salesman was able to plan his work to the best advantage.

No effort was spared to produce results. Suggestions to husband or grown-up children when the housewife's birthday was near, or at Christmas time, often produced results. Home demonstrations were featured and machines were left in the houses wherever possible.

A very generous installment plan was part of the programme. Just before the Christmas holiday season, several advertisements were run announcing that a washer could be secured for an initial payment of $5. with no further payment till the next February. This proved a great puller.

The results of all this steady work was that an unprecedented number of machines were sold and the idea of steady plugging has taken root in the sales force, with good results still coming.

Set a Mark To Shoot At!

Does Your Sales Quota Yield a Profit After Expense is Deducted?—Set a Definite Total and Work to that End—Cutting Down Expenses—Means of Increasing Net Profits

By A. M. BURROUGHES

To operate a business successfully, it is necessary that you have some definite standards by which to measure results accomplished. You must have a mark to shoot at.

After an analysis of your territory and its prospects you may find, for example, that you con reasonably anticipate an annual sales volume of $36,000.00. Then divide it like this:

$36,000.00	Annually
3,000.00	Monthly
693.00	Weekly
116.00	Daily (six-day week)

Your daily sales quota is $116.00, but right now is the time to see if that will yield an adequate profit after your daily expense has been deducted.

Make a chart of the daily expense that is involved when you open your doors every morning. The business month will consist of twenty-six days, and each week of six days in applying rent, light. heat, etc. The figures given below, are used simply as an illustration of the principle only. In practice these accounts must be carefully based on actual conditions.

Rent	$5.75
Light, Heat and Power	2.00
Postage, Telf. and Telg.	1.00
Interest paid and Cash Discount given	1.00
Salaries	9.00
Taxes and Ins.	2.00
Shop Exp.	3.25
Advertising	2.50
Depreciation	1.20
General exp.	.50
	$28.20

In these expenses a salary is included for the proprietor. This is a part of the expense. You should draw your salary as any other employee of the business. It must be included in the salary amount if you are to have a true basis for figuring profit.

Cash discount given is rent paid for money just as truly as interest, so that item is included in the expenses.

Depreciation is actually figured annually. It should, however, be estimated and charged monthly. At the end of the year an adjustment can be made.

From our daily chart we find that our anticipated sales are $116.00 daily, and our fixed expense at least $28.20 daily.

$116.00
28.20

$ 87.80

This leaves $87.80 for the cost of goods sold. For purposes of illustration, we will say that you mark-up your merchandise 30% on sales (and all mark-up should be figured on selling price). Perhaps your mark-up is larger or smaller. Conditions vary in different localities. Using 30%, then your gross profit will be:

30% of $116.00	$34.80
Expense	28.20
Net Profit	6.60
% Net Profit	.057

This is not an adequate return for the time, effort and capital invested. It would give you only about $2,000.00 net return on annual sales of $36,000.00 To increase net profit you must do one or more of three things—

1. Increase selling prices.
2. Increase sales volume.
3. Decrease expenses.

Competition and established sales policies have fixed the selling prices and for this reason you cannot increase the mark-up.

But the last two factors are within your control. You can possibly increase your net profit by both increasing sales and lessening expense. Better service, a more intelligent cultivation of territory and greater sales effort will increase the sales volume. You can add at least $9.00 per day to your sales by these means.

By careful use of light and by adopting other economies. you should save 25 cents per day. You can probably save 25 cents a day in the store by eliminating wastes and lost time. Possibly a salary saving of 50 cents per day may be made in the salary account.

On this basis re-figure the daily quota of Sales and Expenses and Profits.

Sales

$39,000.00	Annually
3,250.00	Monthly
750.00	Weekly
125.00	Daily

Expenses

Rent	$5.75
Light, Heat and Power	1.75
Postage, Telf. and Telg.	1.00
Interest paid and Cash Discount given	1.00
Salaries	8.50
Taxes and Insurance	2.00
Shop Expense	3.00
Advertising	2.50
Depreciation	1.25
General Expense	.50
	$27.20

Profit

30% of $125.00	$37.50
Expense	27.20
Net Profit	$10.30
% of Net Profit	.0824

Net Profit on $39,000.00 Annual Sales $3,213.60.

If 30% is your Gross Profit and your fixed daily expense is $27.20 then you must sell each day $90.70 worth of goods before you have made a cent of profit.

For 30% of $90.70=$27.20 Daily Expense.

Then 30% of every additional dollar sold is Net Profit.

Set up this daily quota. Keep a record of it. Compare your actual sales with your quota daily. Quota should be your minimum performance. When you fail to make wour daily quota, add the deficit to the following day.

"New Factory at Niagara Falls"

Construction of a factory for the Dominion Insulator and Manufacturing Co., Ltd., a division of the Ohio Brass Company, was recently started at Niagara Falls. The new plant will produce high tension porcelain insulators, and electric railway equipment, such as trolley material, rail bonds and car equipment.

It is stated the factory will be of most modern construction and that the layout of machinery and buildings is arranged for the most advanced processes. Production will be started sometime before January 1, 1923.

Activities of Manitoba Electrical Association

At the fortnightly luncheon of the Manitoba Electrical Assn., held at the Fort Garry hotel on Thursday Oct. 5th, the speaker of the day was H. J. Vennes, Transmission Engineer, Northern Electric Co. His subject was "Radio Transmission." Mr. Vennes said that if radio broadcasting is going to continue to be of popular interest, it must be carried on, on a very high level, that is to say, the transmitting equipment must be capable of transmitting either voice or music with practically no distortion, and the entertainment must be provided by very high class artists, otherwise it will not be of sufficient interest to attract the interest of the general public. Furhermore there must be government regulations as to wave length allocation, so as to prevent the interference of the various broadcasting stations. There will also be required some regulations in regard to receiving sets. Unless due consideration is given to all these points, it is quite evident that radio broadcasting will not grow in popularity.

Mr. Vennes also conducted a radio demonstration with a receiving set which was installed in the dining room of the Fort Garry in connection with a 10A Northern Electric loud speaker. This was the first demonstration made with this equipment in Western Canada. Broadcasting was done from the radio-telephone station which has recently been installed at the Sherbrook Exchange by the Manitoba Telephone System. The programme included a short talk by Mr. H. E. Brockwell, chief engineer of the Manitoba Telephone System, outlining the use which is to be made of this equipment; it sounded as clear as though he were standing in the room.

He said that it is the intention of the Manitoba Telephone System to use this equipment as a part of a radio-telephone link to operate between Swan River and The Pas The present equipment will constitute part of the installation for one terminal of the radio link and when the remaining equipment is provided it will furnish telephone service between The Pas and Swan River. This equipment will be so associated with the telephone lines at Swan River and The Pas that a telephone subscriber at The Pas can talk to any telephone subscriber in Swan River or any other point in the Province. The transmitting unit in this equipment will have two 250 watt vacuum tubes in the oscillating circuit, and, two similar tubes in the modulating circuit. It is considered this equipment will have a daylight range of 150 miles, although good atmospheric conditions and especially at night the range may be ten times or more greater.

With commercial telephone equipment available at the present time, it is not possible to make telephone transmission reliable over a distance greater than about 200 miles, as since for toll service it is absolutely necessary that the transmission should be of a commercial grade at all times, and therefore the equipment must be designed with the idea of giving satisfactory transmission under the worst conditions.

A large amount of development work is being done at the present time on vacuum tubes of much greater capacity than those used in the past. The Western Electric Co., have actually made power vacuum tubes with an output capacity of 10 and 100 kw., and as soon as the associated equipment is provided for using these tubes in a radio phone transmitting outfit, it will be possible to talk over a much greater distance than can be done at the present time, it is not at all inconceivable that Transatlantic Radio Telephony will be established before very long. A vote of thanks was tendered Mr. Vennes.

Miscellaneous Notes

The Manitoba Power Commission is preparing for a busy season next year. They expect to build a large mileage of high tension line, and start on a very comprehensive network of rural lines throughout the Province of Manitoba.

George L. Guy, has been engaged by the City of Fort William to investigate and report on the construction, operation, and management of the municipal Electric Railway System. It has been showing a loss for a number of years, and it is hoped by reorganization and improved operating methods, to be able to better its standing. The investigation is to start on the morning of October the 1st, and the report will be available about three weeks later.

The Canadian General Electric Co. Ltd., having recently absorbed the Canadian Edison Appliance Co., Mr. J. E. Brickenden, recently western representative of the latter firm has joined the staff of the Canadian General Electric Co., Winnipeg. He will continue to look after the Hotpoint lines in Manitoba, Saskatchewan, and Alberta. He will handle the jobbing end as in the past. including the C.G.E. branches.

Mr. Cleveland, consulting engineer, was a recent visitor to Winnipeg where he investigated the operations of the Winnipeg Hydro-electric System.

So many accidents happened after the severe storm that visted Winnipeg this year, when there were many fallen wires. it was deemed necessary to use safety first propaganda. The accompanying cartoon was part of it.

A Brief Discussion of the Vacuum Tube as Adapted to Wireless Telephony

Application First Made in Wired Telephony—The Wehnelt Cathode—Curves Obtained With Peanut Tube

By W. B. CARTMEL, B.S., M.A.*

The lecture that I am going to give you this afternoon covers the transmission of speech and music by radio. What I have in mind is a discussion of the finer points of receiving and transmitting equipment which are necessary in order to satisfactorily transmit speech or music. Such transmission has only been rendered possible by the development of the vacuum tube, so that my paper will include a very brief discussion of these tubes and especially of the peanut tube in which I believe you are all extremely interested. I do not intend to say much about vacuum tubes in general because amateurs are quite familiar with such tubes, in fact it was stated recently in one of the papers that there are over four thousand vacuum tube sets in use in Toronto. As you are all aware, the audion bulb has resulted from a discovery made by Edison in the year 1883. He placed a metal plate within an incandescent lamp bulb in which the filament was lit up by a D.C. voltage of something like one hundred volts. On connecting this plate with the positive terminal of the filament, he was able to obtain a current of several milliamperes. The arrangement is shown in Figure 1.

Discovery of Electron

This was never properly understood until the discovery of the electron in 1897 by Sir. J. J. Thomson. It was found that in the exhausted glass bulb particles of electricity were shot off from the filament across the vacuous space in the lamp to the metal plate and these particles then flowed around through the connecting wire of the milliammeter back to the positive terminal of the filament. It is not my present purpose to enter into a long discussion about electrons, but I do wish to say that in 1897 Sir J. J. Thomson did definitely prove that electricity consists of very minute particles.

Adaptation of Vacuum Tube

The adaptation of the electron tube for amplifying speech was begun ten or fifteen years ago by the engineers of the Western Electric Company and of the American Telephone & Telegraph Co. in the U. S. Many of these repeaters are through line repeaters and current is flowing through their filaments twenty-four hours a day, every day in the year. For this reason it was found important to have a minimum consumption of electric power in the filament. You will readily see the importance of economy in this case; while others were developing a tungsten filament for vacuum tubes, telephone engineers were working on a type of filament more difficult to produce but having the advantage that it consumes less power. This filament was originally a European development and is known as the Wehnelt cathode. The Western Electric engineers, starting with the idea of the Wehnelt filament, which is a filament coated with certain chemicals making it give out electrons at a lower temperature than would be required by a tungsten filament, finally succeeded in developing a filament consisting of a platinum-iridium wire coated with barium and strentium exides which gives off electrons copiously. It only requires to be heated to a dull red heat as compared with the white hot tungsten filament. In this way they succeeded in producing a vacuum tube which gave splendid results with only a very small consumption of electric power. I have here a picture of this tube (Figure 2). It was used for amplifying currents in a telephone line.

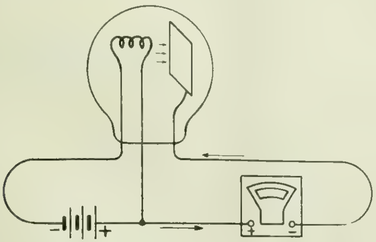

Fig. 1—Discovery of Edison Effect

Developments of the VT-I

I wish next to speak of the development of a little tube used as a detector or an amplifier designed for use by the United States Signal Corps, and shown as the VT-I (see Fig. 3). These were produced by hundreds of thousands during the war. The filament of this tube was made of the Western Electric standard filament material, previously mentioned as having been developed for repeater bulbs, and in this tube good results were obtained using only 1.1 amperes and 2.5 volts for heating the filament. This made a record for economy of power consumption and led to further efforts in this direction, resulting in the development of the peanut tube (Fig. 3) which will give excellent results with only one volt and .25 ampere in the filament. This you see will run very well from one dry cell.

I now wish to show you some curves obtained with the peanut tube, (Fig. 5). These curves show the value of plate current that is obtained with different currents flowing through the filament. There is also a dotted line showing how the grain increases with the filament current What is referred to here as gain frequently called amplification. On this curve the gain obtained is in the neighborhood of 24 miles of standard cable, which is the telephone engineers way of measuring amplification. This means an amplification of one hundred and eighty seven times. The method of measuring gain in miles of standard cable arose in connection with telephone repeater bulbs. On telephone lines there is a limit to the distance over which one may talk satisfactorily. Talking through a telephone over the best open wire lines this limit is about eight hundred miles, unless a repeator or some other means is used for increasing this distance. On talking over a telephone cable however, the telephone current is cut down much more strongly and satisfactory transmission from an ordinary telephone set can not be obtained over a greater length than thirty miles of standard No. 19 gauge, paper insulated, telephone cable.

Measuring Gain From a Vacuum Tube

In our laboratories we make up an artificial cable box containing a suitable combination of resistance coils and condensers which is used for various purposes, and among other things for measuring the gain from a vacuum tube. In measuring the gain by means of this artificial cable, we find how many miles of cable may be added in the circuit when a vacuum tube is inserted, and still get the same volume of sound in the receiver. This gives us the gain in miles of standard cable. You will note that as the current through the filament is increased from .25 of an ampere up to .3 of an ampere the gain increases by only about one tenth of a mile out of a total of twenty-four miles, and there is therefore very little advantage in using higher current values.

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*Before Wireless Assocation of Ontario.

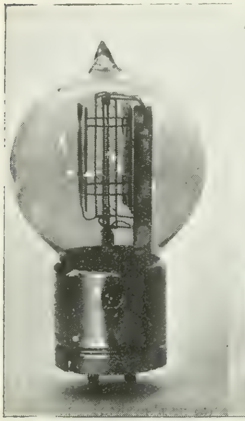


Fig. 2
Repeater Bulb

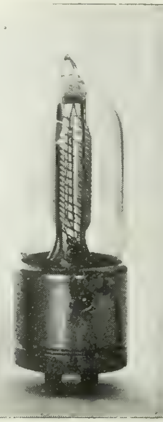


Fig. 3
VT-I Detector

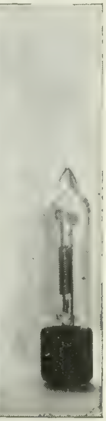


Fig. 4
Peanut Tube

From the standpoint of life, variations in the current through the filament make an enormous difference. In order to obtain the best results with longest life with this filament, it is desirable to check the filament current with a suitable ammeter. This is different from the case of the tungsten filament which is run at constant voltage in order to get the best results. The other conditions that we reccommend are that the plate current should not exceed .6 of a milliampere. These are the points to be borne in mind if you wish to obtain a very long life from your tubes. Keep the plate current down to .6 of a milliampere and the filament current as low as possible. Now, as regards the battery voltage, the plate battery should not be run at over 50 volts with the grid connected direct to the negative end of the filament, although 40 volts is more generally used. If we have a negative potential—a so-called bias potential—on the grid, we may add five or six volts in the plate battery for each volt added. Thus with a negative voltage of 1-½ volts on the grid we may add nine volts more to the plate battery making a voltage on the plate of forty-nine volts or with the grid 4-½ volts negative we recommend a maximum voltage in the plate battery of 67-½ volts.

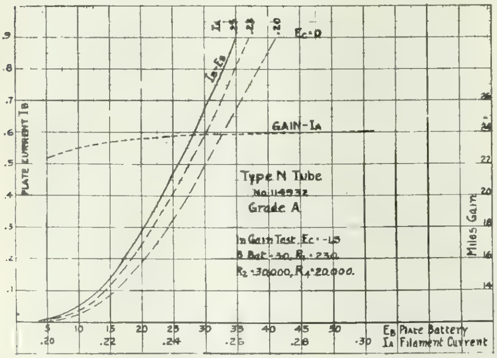


Fig. 5—Curves obtained with peanut tube

Power Required to Produce Electron Emission

Now, while I have emphasized the conditions under which you obtain the longest life out of your tube, I do not wish you to think that these tubes are liable to burn out in a short time or that they are inferior as regards length of life to tubes having tungsten filaments. The emission of electrons from tungsten filaments is so poor that they have to be heated white hot in order to give a satisfactory emission of electrons. I have here a curve (Fig. 6) showing the difference as regards power required to produce the same amount of electron emission from the tungsten filament as from standard exide coated filament. It will be noted from this curve that using standard coated filament it is possible to construct an efficient tube having an average life of 5,000 hours. A tube known as the VT-I has an average life of 5,000 hours. This length of life is not guaranteed for every tube, although since it is an average value many of the tubes exceed this length of life.

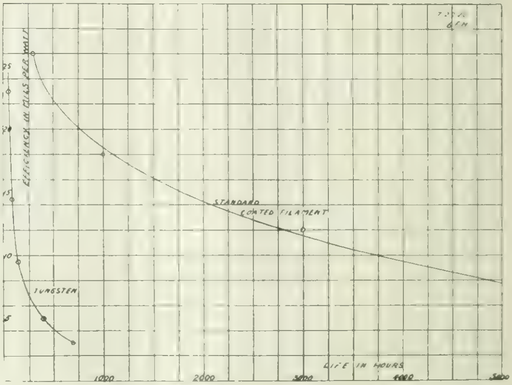


Fig. 6 Comparison of power required

Toronto Branch Will Not Broadcast

Toronto members of the Wireless Association of Ontario will not take advantage of the recent change in government regulations which restrict the privilege of obtaining special amateur broadcasting licenses solely to amateurs' associations. "So long as I have any say in the matter, we will not take out a broadcasting license," said Pres. Keith Russell. He gave several reasons, principal among which were the heavy cost that would be entailed in maintaining a station, the necessity of having regular club rooms, and the fact that there promises to be no shortage of broadcasting to listen in to during the coming winter. The change in regulations, he pointed out, was made with the special view of enabling fans in districts where there was no broadcasting to remedy this lack. New regulations also provide that in case an association does not desire to operate a station of its own, it may relegate this privilege to any one member or group of members.

Material Required For a Simple Crystal Set*

Dealers Can Avoid Bad Assortments of Parts by Selling Complete Sets of Material For Building

Over 60 per cent. of all radio sets are built by their owners. It's cold logic you can't afford to pass up this market. Yet a good many merchants are attempting to gain it by a round-about, and frequently unprofitable way. Their method usually consists in stocking a large assortment of different makes of parts, many good in themselves but having no relation to each other. The result is uncertainty in turnover and profits.

Every radio dealer has had the experience of selling radio sets piecemeal; the customer (usually a boy) comes in time after time for trumpery bits of apparatus and the business, if not unprofitable, is troublesome.

One way of getting over this difficulty is to advertise and sell a complete set of parts for making up a complete set. By adopting this method of procedure the customer gets what he wants in one purchase and saves the dealer a great deal of time. Then again, a well advertised set of parts is a great drawing card for this class of trade.

This present article deals with only the simplest and cheapest construction. Such a set is a starter, however, and pays the dealer if he can sell it without too great an overhead. It should be understood that ten miles is about the range of such a set.

Only Few Parts Required

Here are the items to sell your customer:—

1 fibre tube, about 4 in. outside diameter, wall 1/16 in. or 1/8 in. thick, 6 in. long.

½ lb. spool No. 22 or 24 cotton covered wire.

10 contact points.

4 binding posts.

1 switch arm, knob and bushing, complete.

1 crystal detector.

1 small fixed condenser.

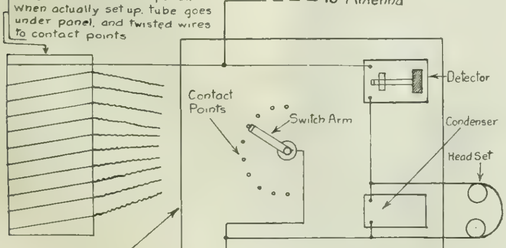
1 head set.

1 fibre panel, about 7½ in. by 1/8 in. or 3/16 in.

An antenna is not essential if very close to a good broadcasting station. Telephone wires, clothes lines, bed springs and so on have been used with success under such circumstances. It must be understood that this will not do for any considerable range.

How to Put the Set Together

With the above apparatus it is no great trick to put a set together. You can instruct your customer as follows:—


Tube is shown outside panel. When actually set up. tube goes under panel, and twisted wires to contact points
To Antenna
Detector
Contact Points
Switch Arm
Condenser
Head Set
Fibre Panel
To Ground

Putting the set together

Wind the tube with 110 turns of wire, tapping every tenth turn, that is, bare it and twist it as shown in the drawing. Now arrange the contact points on a fibre panel. in a semi-circle so that they will be covered by the switch arm which is also placed on the panel.

The next step is to connect up the various pieces of apparatus. Connect the coil taps to the contact points. Arrange the detector and condenser on the panel as shown in the drawing and fix the binding posts for antenna and ground.

A window display of the complete parts, with a card giving the individual items, is a good way of advertising the set. Another stunt is to mount all the parts on a large panel, with a showcard. Again, a set is nicely made up of the materials, and given a prominent window position. However, such outfits are not hard to sell, the main thing is to give the fan a clear idea of what he needs.

Many Radio Licenses Issued

The Department of Marine and Fisheries has announced that the facilities for obtaining radio receiving licenses have been extended whereby this class of license will, in addition to the post offices already announced, be obtainable at the following post offices,—

South Vancouver, B. C.; New Westminister, B. C.; Brandon, Man.; Fort William. Ont.; Port Arthur, Ont.; Sault Ste Marie, Ont.; Peterboro, Ont.; St. Catharines, Ont.; Niagara Falls City, Ont.; Kitchener, Ont.; Sarnia, Ont.; Galt, Ont.; Chatham, Ont.; Stratford, Ont.; Guelph, Ont.; St. Thomas, Ont.; Kingston, Ont.; Lachine, Que.; Westmount, Que.; Three Rivers, Que.; Sherbrooke, Que.; Verdun, Que.; Glace Bay, N. S.; Moncton, N. B.

An official list of the radio stations in the Dominion is being prepared by the Department of Marine & Fisheries and will be ready for issue at an early date. The list is being made up in an attractive form and will cost approximately 75 cents per copy, including supplements, the latter will be issued every two or three months to keep the main list up to date. Any person desiring to obtain a copy of the new list should apply to the Director, Government Radio Service, Department of Marine & Fisheries, Ottawa, to have their names placed on the mailing list.

Toronto leads the Dominion for the number of Radio Receiving Licenses issued during the month of July, 110 having been issued by the postmaster of that city, Vancouver comes second with 103, and Windsor again well up with 90. The total number of receiving licenses issued during the current fiscal year to the end of July is 3,270.

Radio enthusiasts are again reminded that is is necessary for all persons operating radio equipments to have a license, the charge for a receiving license being $1.00 per annum.

Canadian Westinghouse in Radio Field

The Canadian Westinghouse Company are putting on the market a regenerative radio receiving set. To make this equipment, a special radio department has been started at their Hamilton plant. The Westinghouse vacuum tube sets will employ the regenerative current principle covered by the Armstrong patent.

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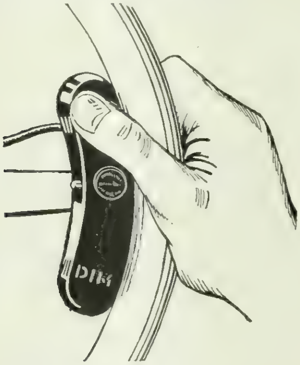
*From information supplied by S. W. Place, Radio Engineer, Diamond State Fibre Co.

The Latest Developments in Electrical Equipment

The National Electric Heating Company are manufacturing a Radiophone set; two thousand and three thousand ohm capacity. This set is very finely constructed, mechanically, and carefully tested and wrapped before shipment, and is in marked contrast to some of the headsets seen on the market during the past few months. The National Radiophone set is shown in the accompanying illustration.

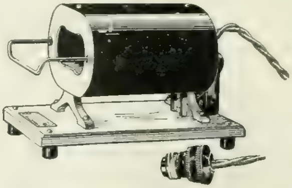
"Roxwitch" Headlight Control

A device for controlling the headlights and horns of automobiles has been placed on the market by the Patton-MacGuyer Company, Providence, R. I. When installed, the device is located on the inside of the steering wheel and is operated by a rocking motion. When bright lights are required it is pressed down, and when dim are needed it is rocked back in the opposite direction. In mid-position the lights are off. The horn button which is located in the centre of the device is operative at all times. As all parts are enclosed, it is claimed that no dust or rain can interrupt the operation of the switch.



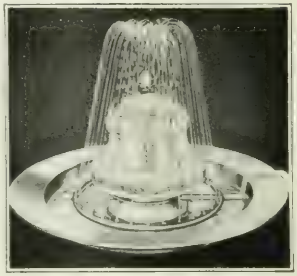
Furnace for Heating Irons

The device shown in the illustration has been placed on the market by the Op-al Electric and Manufacturing Company, Thirty-sixth Street and Kenwood Ave., Indianapolis, Ind. It is claimed by the manufacturers that it will heat two four pound irons in from ten to fifteen minutes. It is also used for heating right-angle soldering irons, tempering or annealing small tools and parts, heating small brands, welding babbitt and solder, etc. The furnace is claimed to operate satisfactorily on voltage fluctuations of five per cent; current consumption is about 500 watts. The inside dimensions are 3 by 1½ by 4½ inches; overall dimensions 8 by 5 by 5 inches, weight 4½ lbs. The manufacturers have also placed on the market a curling iron heater, designed for those who prefer to use the plain curling iron or waver rod. This is made large enough to take the largest curling iron and is constructed of satin finish aluminum throughout. It is 2½ by 6½ by 3¼ inches in size and weighs 1½ lbs.



Electric Humidifier

A device for humidifying and deodorizing the air in hotels, homes and other places, has been placed on the market by the Ingersoll Electrical Products Company, 109 West Austin Avenue, Chicago, Illinois. The action of the device has the effect of an indoor fountain, but no water connection is required. With each humidifier is furnished a rattan basket about 2 inches high and 17 inches diameter. The humidifier pan sets in the basket and hides the nickel plated outside of the lower portion of the pan. All metal parts are nickeled and the dome is ivory tinted; current consumption is about 60 watts. The spray ring, globe, rheostat and cord are shipped in a 13 by 13 by 13 inch package weighing about 11 lbs., and the pan and rattan basket weigh about 8 lbs.

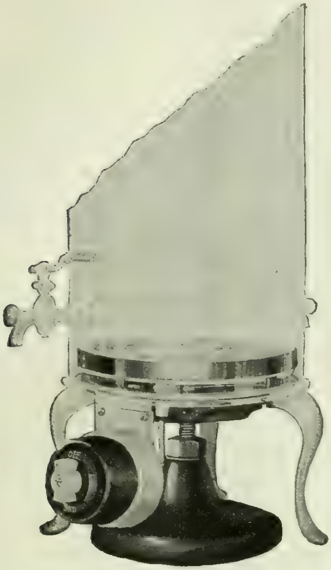


Royal Electric Cleaner

The Continental Electric Co., 505-11 King St. E., Toronto, Ontario, are marketing the Royal Electric Cleaner, of which the general design is shown in the accompanying illustration. The cleaner is of the "air alone" type and the manufacturers claim growing popularity for this feature. It is stated that the best materials are employed in the construction of this cleaner. Further claims are made as to its durability and general efficiency of design. Munderloh & Co., Ltd., Montreal, Quebec, are also distributing this cleaner.

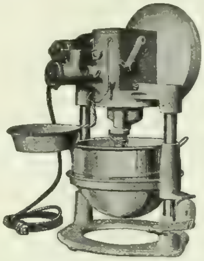
Electric Coffee Urn Heater

An electric coffee urn heater designed for use in hotels, restaurants, cafeterias, or where ever large coffee urns are used, is being made by the Westinghouse company. This heater gives a temperature at three different heat intensities and is operated by means of a three heat indicating snap switch. The base is made of cast steel with a black japan finish and is adjustable so that the heater can be raised or lowered to the most efficient position under the bottom of the urn. The heating element is of the standard Westinghouse exposed coil type. The heater is made in two sizes, 8 and 10 inch, two wattages and several voltages. The eight-inch size is designed for use with five and six gallon urns and the ten-inch size for urns of larger capacities.



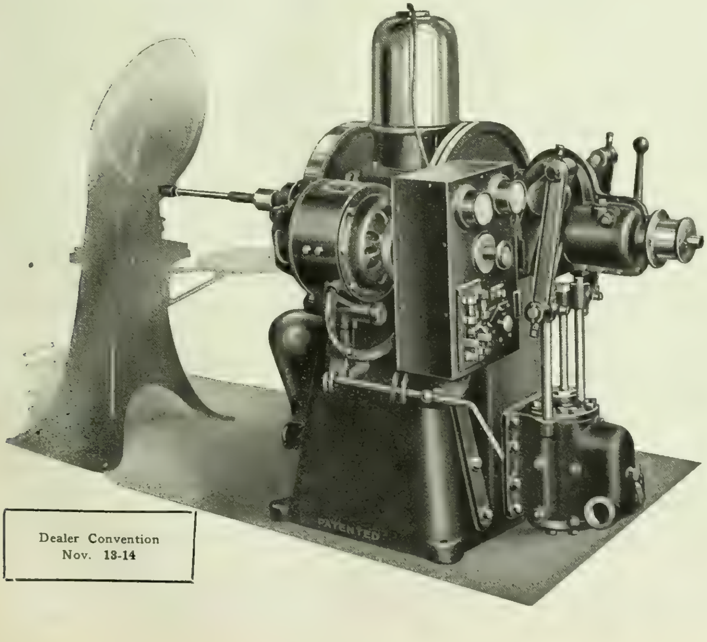
The Mixonette

The Read Machinery Co., York, Pa., are marketing under the name "Mixonette" a machine designed to do the work of mixing, beating and slicing in hotels, restaurants, etc.



The machine has two speeds, clutch, beaters and bowl and is finished in white enamel. Equipment includes a 10 quart bowl, whip and beater, and the machine may be adapted for meat and food grinding, vegetable slicing, coffee grinding, etc. A 1/8 h.p. motor is used.

Come to the Convention, Nov. 13 and 14.



Dealer Convention
Nov. 13-14

Caron Light Water and Power Plant

An isolated plant for farm purposes has recently been put on the market by Caron Bros., Inc., Montreal, Canada. The accompanying illustration shows the general assembly. Construction embodies water cooling, 1,000 watt generator, switchboard and self starter, 700 g.p.m. water pump, belt pulley from engine for driving grinder, churn, woodsaw, etc., storage battery, friction drive for cream separator and vacuum pump for milking machine. Either 32 or 110 volt generator can be supplied; it is driven from the engine flywheel. The engine is 3 h.p. and runs at 900 r.p.m. It operates on the two-cycle principle, with special construction so that compression takes place in the lower end of the cylinder. The battery is of the "Hart" glass jar type and can be furnished in 90, 150, 180 or 210 ampere hour capacity.

Current News and Notes

Brantford, Ont.

The rates on street lighting have been increased. They will mean an increase in cost of approximately $6,500 per year to the city. The increase is rated as follows: 100 watt tungsten lamps from $6 to $7. 150 watt tungsten lamps from $7 to $8, 200 watt tungsten lamps from $9 to $10, magnetic arc lamps from $30 to $40.

Calgary, Alta.

Hydro-electric development, which would save Calgary approximately $250,000 annually, is advocated by Commissioner A. J. Samis in a statement made recently. The commissioner proposed a Hydro-electric scheme financed by the provincial government, the current to be distributed radially to all the towns and cities within feasible radius of the central plants.

The Brotherston Electric Company have just completed the contract for wiring and lighting fixtures for the memorial hall of the G.W.V.A., at Calgary, Alta., at an estimated cost of $2,160. The billiard-room is equipped with "Brascolite" lighting fixtures.

Howden and Hudgings, electrical contractors and dealers, of Calgary, have recently been awarded the wiring contract for the light, heat and eelephone systems for the Radio Block, situated on 13th Avenue and 1st street, West, Calgary, for W. R. Hull & Company, owners; also installing nine McClary electric ranges, together with nine Cutler Hammer 3,500 watt water heaters. W. R. Hull & Co., are supplying ranges and water-heaters separate from wiring contract.

Mr. W. H. Whitney of Calgary won first prize in the sales contest recently put on by the Eureka Vacuum Cleaner Company. The prize won by Mr. Whitney was three Eureka cleaners. The company's idea was to show that a little extra effort during the summer months would be productive of results, and Mr. Whitney succeeded in making a fine demonstration in support of this theory.

Cobalt, Ont.

The listings of the courts which will try the two Hollinger suits in which Northern Canada Power Company figures, being plaintiff in one, have come out and they indicate that the appeal against the decision in the damage suit will be heard in October and the action for "specific performance" about November. The action for specific performance is Northern Canada Power Company's effort to secure the signing of a contract which it is alleged Hollinger agreed to sign and said to cover all required power for the life of the mine. The other action is in the appelate court and is Hollinger's appeal from the decision in its suit for damages arising out of a shortage of power in the winter of 1920-1921.

Emerson, Man.

The town of Emerson is installing a distribution system, purchasing power from the Pembina Light and Power Company, Pembina North Dakota. Geo. L. Guy, Winnipeg, is consulting engineer.

Fort William, Ont.

The partnership between H. G. Earley and W. H. Cowley. who carried on business under the name of Fort William Electric Company, has been dissolved. Mr. Cowley is carrying on the business at the same address, 107 S. May Street.

Hamilton, Ont.

An investigation is being made by Mayor Coppley to see if the 20-cent rate per thousand gallons fixed for the water supply to the new Hydro station on Beach road is an unfair one. E. I. Sifton, Hydro engineer, stated that the 20-cent charge was wrong in principle, because power was sold to the Hamilton waterworks, and for street lighting purposes, at cost. The Ontario commission had argued for a 12-cent rate, such as was paid by the Hydro stations within the city limits. The 20-cent rate would come out of Hamilton in any case, as the cost of the water supply for the new station would be entirely charged against the city. The water is used for transformer cooling.

Kitchener, Ont.

The Doerr Electric Co., of Kitchener, Ontario, believes in tying up close to national advertising of the products they sell. They arrange with the news stands to let them put their rubber stamp on the advertisements of their products, thus letting folks know where the article can be bought.

Lacombe, Alta.

L. M. Whitecotton, has recently opened an electric shop at Lacombe, Alta. He will do electrical contracting in addition to merchandising.

London, Ont.

The Public Utilities Commission has decided to raise industrial power rates nine per cent to offset an increase made in the cost of power from the Hydro-electric Power Commission. The local Commission was faced with a deficit of $25,000 or $26,000 on this year's operations as a result of the H.E.P.C. rate increase having been made retroactive to the first of the year.

Four tentative outlines for more adequate street lighting in London have been prepared by City Engineer H. A. Brazier and E. V. Buchanan, general manager of the public utilities commission. It is proposed to choose at random four blocks throughout the city and employ them as sample streets. Plan No. 1 will be a light on every pole in lieu of the light on every second pole as at present. No. 2. will be as at present, a light on every second pole; No, 3 will be larger lights on every second pole, while No. 4 will be bigger lights on every pole.

Montreal, Que.

Mr. F. A. Sabbaton, vice-president of the Laurentide Power Company stated recently that they were turning back into the Laurentide Company's electric boilers, which had been recently installed, power that meant a saving to the paper company of some 5,000 tons of coal per month. The Laurentide Power has been receiving payment since the first of July for 125,000 horsepower on its various contracts.

The outstanding feature of the annual report of the Montreal Tramways Company for the year ended June 30, 1922, now going forward to shareholders, is the increase of nearly $62,947 in net earnings, as compared with the previous twelve months period, despite a decrease of about $60,000 in gross earnings. This excellent result was due to a reduction in the operating expenses, from 75.63 per cent of gross in 1921, to 71.69 per cent for the past year.

The Board of directors of the Montreal Tramways Company was re-elected at the annual meeting of shareholders held at the head office recently. E. A. Robert, president, stated that financial conditions are improving and cost of operations lessened by the growing cheapness of money. In the last few years the revenue from passenger traffic decreased, but the turning point has been reached and the coming year will show an improved position.

The Eureka Vacuum Cleaner Co. have opened up a new retail store at 218 Craig Street, West, Montreal. This store is under the management of L. E. Seguin, who was formerly with L. C. Barbeau and Co. This makes the third store of the company in Montreal and we understand it is their intention to open others.

Toronto, Ont.

A recent report states that up to date the Hydro Commission has recommended and the Government has sanctioned by Order-in-Council a total construction of 508 miles in 70 townships throughout Ontario. Of the total projected mileage, 228 miles is actually built and the balance under construction, some of it nearing completion. The new construction has added 6,000 rural customers to the 2,000 that were previously taking Hydro power.

The report of the Northern Ontario Light & Power Company for the month of July shows gross earnings of $72,390, being an increase of $10,345 over July, 1921.

Welland, Ont.

President O. E. Fleming, of the Canadian Deep Waterways and Power Association, stated that a group of financiers were now prepared to buy the power proposed to be developed in connection with the deepening of the St. Lawrence, at a price that would cover cost of operation, maintenance, interest charges and sinking fund. He said that the price was based on the estimated cost of the project, over $252,000,000.

Windsor, Ont.

Albert E. Eastman, vice-president and general manager of the Windsor, Essex & Lake Shore Railway, met the Transportation Committee of the City Council, recently in regard to its application for a five cent fare to the new southerly city limits. He explained that so far as carrying the people to the newly established limits for five cents was concerned, the company would be perfectly satisfied, but it would mean, according to the franchise, a revising of the tariff zone districts and a heavy loss when figured out upon a basis of five cents off every through fare. Members of the committee saw his point and agreed to put the matter up to the Ontario Railway Board.

All but four of the 91 booths contemplated for the Pure Food and Electric show, which is to take place in the Windsor armories Octobed 16 to 21, are engaged, R. M. Jaffray, manager of the exhibition, announced recently. In the electrical section, all but one of the booths have been engaged. The show is under the auspices of the Border Cities Retail Merchants' Association.

Wiring Contracts Awarded

Aylesford, N. S.

O. E. Steeves, $5,000 res.; $3,000 res.

Ford, Ont.

G. W. Whelpton, 356 Hall Ave., $90,000 school, Drouillard Rd.

Glace Bay, N. S.

John Donovan, Margaret Street, $15,000 bank. Commercial St.

Guelph, Ont.

Arthur Knowles, High St. London, $325,000 school

Hamilton, Ont.

Culley & Breay, 35 King St. W. altn. to store & offices 116 King St. E.; $58,000 office bldg. & electrical store.

James Donaldson, 184 Charlton Ave., W., $37,000 res., Aberdeen Ave.

Inglewood, Ont.

Spratt & Son, Inglewood, on public school.

Kentville, N. S.

Perce DeFry, $6,000 res., Main St.

Kitchener, Ont.

N. Hagen, 34 Ellen Street, $10,000 res., Wellington St.

Star Electric Co., King Street, W., $4,000 Wilhelm St.; $5,000 Troy St.

Lachine, Que.

E. Miller, 141 Notre Dame Street, $6,000 res.

Leamington, Ont.

G. H. Whelpton, 356 Hall Ave., $65,000 high school.

Mimico. Ont.

Warner & Fordyce, $4,500 res., Mimico Ave.

Moncton, N. B.

Brooks, Lutz Street, $8,500 stores & res., High Street.

Wm. G. Crowley, St. George Street, $50,000 school, Lester Ave.

Thos. Johnson So., Marie Street, $6,000 res., Cornhill & Caledonia St.

Montreal, Que.

A. Allard, 162 Mt. Royal, E., $9,000 res., St. Denis St.

J. A. Anderson & Co., 205 Mansfield St., $500,000 council bldg. 255 Mountain St.

A. Barbeau, 146 Amherst St., $6,000 res., 829 Lagauchetiere E.

Booth Bros., 5727 Sherbrooke W., $24,000 three res., Westminster Ave.

A. Demers, 52-7th Ave., Ville St. Pierre, $8,000 res., (St. Clair St. Ahuntsic).

M. Deschenes, $10,000 res., Desjardins St.

J. George, $5,000 res., 1399 Notre Dame E.

R. Goulet, 3440 Letang St. $9,000 three flats, De Gaspe; and res on St. Hubert.

A. Lamarre, $20,000 two res., Melrose.

R. Meloche, 1360 Gertrude St., $15,000 res., Prud'homme.

R. S. Muir & Co., 32 Park Ave., $25,000 two res., Mayfair Ave.

O. Noel, 78 St. Timothee St., $7,000 res., Girouard.

E. Robillard, 255 Hamilton St., $7,000 res., Harvard Ave.

A. Romeo, 2112 Orleans Street, $16,000 six flats, 4th Ave.

J. St. Louis, $9,000 three flats res., Christophe Colomb Street.

R. Talbot, 2112a Boyer Street, $15,000 four res., 1961 Chambord St.

Vallee & Hamelin, 1867 St. James St., $10,000 bungalow, Brock Ave.; $18,000 pr. semi-det. res., Westminister Ave.

Uptown Electric, 926c St. Catherine W., res., 134 Brock Ave.

Niagara Falls, Ont.

A. Green, Walnut Street, $10,000 res., Bampfield St.

Oakville, Ont.

B. E. Sprowl, $3,000, stables, , Dundas St.

Ottawa, Ont.

Art Davis, Bronson Ave., $10,000 res., Clemow Ave.

Dalhousie Electric Co., Dalhousie Street, $4,500 res., Baird St.

Mr. Lee, $6,500 res., O'Connor St.; $5,000 res., Ossington Ave.

Mr. Milks, $9,000 double res., Belmont Ave.

Rideau Electric Co., Daly Ave. $5,000 res., Spadina Ave., Ottawa.; $4,000 res., Kenora Ave.; $4,500 res., Fentiman Ave. $5,500 res., Julian Street.

Stan Lewis, 63 Metcalfe Street, $35,000 Merivale Road.

G. Young, Hampton Ave., $5,000 Ossington Ave.

Outremont, Que.

A. L. Allard, 162 Mt. Royal E., $20,000 cottage, Holyrood Ave.

E. Brignall, $20,000 three flats, Outremont Ave.

E. Hodge, 6 Cuthbert St., $100,000 apt house, Bernard Ave.

A. St. Jean, 1964 Clarke St., three res., $18,000 Outremont Ave.

G. Sherrington, 2215 De La Roche St. $9,000 cottage Davaar Ave.

Point Grey, B. C.

Douglas J Metcalf, 103 Carter Cotton Bldg., $35,000 res., Marine Drive.

Regina, Sask.

Lorne Electrical Co., Smith Street, Regina, $3,000 res., Dewdney St.

United Elec. Co., Ltd., 1818 Cornwall St. Reg. $4,000 res., 16th Ave.

Riverside, Ont

G. Whelpton, 356 Hall Ave., $15,000 municipal bldg. Louizon Rd.

St. Catharines, Ont.

F. E. Carley, 19 Jones St., $10,000 res., Hillcrest Ave.

J. Desand, 187 St. Paul Street, $9,000 res., Hillcrest Ave.

Eckert & Dunnet, 21 Queenston St., on business block St. Paul & Chestnut Streets.

H. W. Homes, 30 Ann Street, $2,500 res 198 Geneva St.

J. H. Sandham Co., 179 St. Paul, $8,000 res., Queenston Road.

Sandwich, Ont.

Harris & Marson, 81a Parkway Ave., Toronto, $125,000 sanitarium, Prince Rd.

S. Woodison, Karl Place, $11,000 three family terrace, Randolph St.

R. Greenwood, 812 Queen St. E., $2,500 store Queen Street E.

Taylor Bros, Gore Street, $3,500 res., Wilson St.

W. Gaul, Charles Street, $4,500 res., Birmingham St.

M. I. Higgins, Ontario Street, $6,000 two res., Avondale Ave.

Toronto, Ont.

Geo. Armstrong, 1217 College Street. $4,500 each four res., 255-61 Briar Hill Ave.; $13,000 res., 283 Inglewood Dr.; $13,000 res., Glenview Blvd.

Harry Alexander Ltd., 6 King W., on large res., Bayview & Lawrence, York Twp.

Avenue.

Mr. Barnes, $80,000 eight stores, Bloor St. & Pauline

Bayview Electric Co., $7,500 add, store, rear 378-80 Yonge St.

Bobenizer & Robson, 409 Margueretta Ave., on Church, Royce & Perth Ave.

Clegg Bros., 79 Blackthorne Ave., $6,000 res., Glenrose Ave.

Phil. Coe, 32 Kennedy Ave., $10,500 res., Baby Point Rd.

W. A. Dean, 146 Jarvis Street, $125,000 warehouse, Front W. & Windsor St.

W. Dellow, 1935 Gerrard E., $5,000 each two res., 160-2 St. Clair Ave. E.

Douglas Bros., 2317 Yonge Street, $4,500 res., 68 Roselawn Ave.; $3,500 res., 204 Erskine Ave.; $10,000 each two res., 1-3 Glenrose Ave.

D. Firth, 79 Law Street, $10,000 each two bungalows, Fairview Ave.; $9,000 each two res., 40-2 Evans Ave.

J. Fraser, $7,000 pr., two pr. res., Roehampton Ave.

E. McNiece, Long Branch, $3,000 grocery store, Lake Shore.

A. J. Morrison, 269 Albany Ave., on store 127 Yonge St.

Moss & Stocks Elec. Co., 1145 Yonge St. on res., Glen Grove Ave., E.

H. S. Norris, 37 Fermanagh Ave., $9,000 each four res., 433-5-7-9, Runnymede Rd.

Patterson Electric Co., 43 Fermanagh Ave., $150,000 add. dairy, Walmer Rd.; $45,000 sunday school Galley Ave.

A. Richardson, 23 Herbert St. $4.500 res., Sheldrake Blvd.; $8,000 1 pr. res., Sheldrake Blvd.

Mr. Sheppard, $9,000 res., 246 Armadale Ave.; and two res., Willard Ave.

Hugh Wilson, 262 Dovercourt Road, $10,000, each five bungalows.

Viking, Alta.

Meathey & Jones, Viking, $2,300 town hall.

Wallaceburg, Ont.

Harrisons Electric Co., Wallaceburg, $63,080 school.

Westmount, Que.

S. J. Holwell, 276-2nd Ave. Verdun, $6,000 add., res., 1470 Western Ave.

Winnipeg, Man.

Schumacher, Gray Co., Ltd., Portage Ave E. $119,000 garage & show room, 251-7 Main Street.

Union Elec. Co., 313 Carlton St. Wpg., $22,000 laundry, Burnell.

Windsor, Ont.

H. P. Hutchinson, 833 Wyan Dotte St., W., $4,300 res., Dougall Ave.

A. McPherson, 1425 Cataragui Street, $4,500 res., Windermere Rd.

Chas. Usher, 9 Aylmer Ave., $10,800 res., Victoria Ave.

Trade Publications

The Northern Crane Works, Ltd., Walkerville, Ont., has issued a little bulletin, No. 24-G. It is described as a "pigeon-hole reminder" that they manufacture several types of electrical travelling cranes, gantries and electric hoists; also make hand power travelling and jib cranes of various

Announcement is made that the Westinghouse Electric & Manufacturing Company has become agent for the DeLaval transformer oil purifiers and dehydrators. This make of apparatus, which operates on the centrifugal principle, is equally well adapted to the removal of sludge from lubricating oil and to the dehydration and purification of transformer and other insulating oils. Some of its distinctive features are that it is simple and effective in operation, reduces the expense of dehydration, is rugged in construction, and uses no filter medium of any kind, thus eliminating a source of delay and expense.

The National X-Ray Reflector Co., of Chicago, have a most attractive folder on "Color Lighting in Show Windows." A particularly interesting phase of the discussion is the effect of colored light on different colors of merchandise. This is shown in the folder in actual color effects; for example, red light on blue article gives the effect of purple and on amber gives yellow; green on red gives pink, amber on blue gives green. Few merchants realize these facts when preparing their window display, and the electrical contractor dealers would appear to have a profitable harvest ahead of him if he is properly equipped with the necessary information on illumination, to coach the merchant in the proper way to obtain more accurate results in the way of color effects.

If you were in business for yourself would you give yourself a job?

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Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Start Early—Make It an Electrical Christmas

The importance of an early start for Christmas business is yearly becoming more deeply embedded in the minds of the electrical trade. The old proverb about an ounce of foresight being worth a pound of hindsight is being taken to heart, and we find live dealers are already considering ways and means of beating their previous holiday sales records.

Christmas sales are comparatively easily made. The season is a sort of spending festival, and all purse strings are loosened. A tide of easy money flows in the weeks before Christmas day.—What we want to do is to secure the greater part of it for the electrical trade.

The problem is a pyschological one, as most selling problems are. From the first of December everyone is thinking more or less of what he is going to buy for Christmas presents. Impress him with the appropriateness of electrical gifts, stress their points of economy, beauty and utility. Do this in sufficient measure, and he is sold.

This year radio is going to be a leader. It is bound to sell to a certain extent whether any effort is put behind it or not, but with a little forceful selling it will sweep the boards as a novelty gift. Suggestion to the public is what is required—advertising suggestion that the broadcasting will be better than ever this year, that a set is in an attractive addition to a home, that it is educational, that a boy who has waited for a set since last spring deserves one now—little ideas that direct the minds of the public.

Electrical toys are things that are not as familiar to the public as they should be. They are, in general, sturdy, value-giving things and they can add considerably to the holiday sales. Publicity will sell them in greater numbers.

Then we have the multitude of practical electrical gifts. Hundreds of suitable presents are included under this head. These are the backbone of the Christmas business and an attractive display is bound to catch the shopper's eye.

The main thing is, **start early** and plan your work. Decide what your campaign is going to be, plan your windows, place yourself in the position of the public and figure out **what would induce you** to buy electrical gifts in an electrical store.

Start early—Make your store Headquarters for an electrical Christmas! Feature this slogan:

Buy Electric Goods
for Christmas
in an Electric Store

Increased Earnings of Power Companies Indicate Better Business

The earnings of the power companies in general show an increase over those of the previous year, another evidence of the increasing growth of business.

The annual report of the Calgary Power Co., covering the year ending December 31, 1921, shows an improvement in earnings of the company, gross standing at $303,724, against $291,041 for the preceding year. Operating expenses, bond interest, taxes and other charges absorbed $229,371, leaving a net profit of $74,352 as compared with $58,358 for the previous year. After appropriating $50,000 for depreciation and bond discount the balance remaining at credit of surplus account and carried forward to 1922 is $199,955.

The earnings of the Ottawa Light, Heat & Power Company for the eight months period ended August 31, 1922, according to a recent statement amount to a gross total of $1,079,797 as compared to a total of $1,031 239 for 1921. The deduction of operating expenses and bond interest leaves a surplus of $199,015 as compared to $169,572 the preceding year.

The gross earnings of the Southern Canada Power Company and its subsidiaries for the seven months ending August 31st, 1922, amount to $773,027 as compared to $681,299 for 1921. The deduction of operating expenses leaves net earnings of $427,163 as compared to $336,356 for 1921, an increase of $90,806.

Huge Success for Customer Ownership Drive

The plan of linking up a central station power company and its clients in closer relationship through the medium of stock ownership in the business was tried out for almost the first time in Canada during the month of October by the Southern Canada Power Company Ltd., and has proven to be an unqualified success. The allotment of 2,000 shares of that company's preferred stock was oversubscribed in four days. The campaign was originally intended to last ten days. Had the allotment been considerably larger there would not have been any difficulty in disposing of the full number of shares.

The Southern Canada Power Company Ltd., has nearly

11,000 customers in a territory comprising fifty municipalities. No customer was allowed more than ten shares. 200 employees of the company were divided into five teams, each one headed by a local superintendent as captain and assisted by officials from the headquarters of the company, where team work, young and energetic spirit, good fellowship and ambition to do things and to do them right are ever present.

J. B. Woodyatt, vice-president and general manager of the company L. C. Haskell, secretary treasurer, and P. T. Davies, commercial manager, were naturally pleased with the reception their campaign met with. Mr. Woodyatt especially as the chairman of the Public Relations Committee of the Canadian Electrical Association sees considerable merit in such a practice. Mr. Percy H. Whiting, of the Central Maine Power Company, Augusta, Me., assisted in the preparation of the necessary publicity and assisted in directing the campaign, his experience in such campaigns in the United States being of great value.

A noticeable feature about this campaign was the thorough preparation of the soil and the careful planting of the seed without which no good harvest may be expected. All newspaper advertising, broadsides, application blanks, and other publicity literature was printed in both English and French languages. The newspaper advertising consisted of full page announcements. The first announcement quoted the Babson Statistical Organization and Mr. Babson's recent recommendation not only to buy power company stocks in preference to all others, but to buy stocks of your home company. It happened that Mr. Babson had recently published a number of reasons for his belief that investments in local power and light companies are best at the present time and these statements were effectively used by the company in their first newspaper publicity. The second step was a full page announcement covering the activities of the Southern Canada Power Company, explaining when it was formed, giving the names of the towns and cities served, outlining power possibilities, attractiveness for industries of every kind, and so on. This advertising was designed to impress readers with the stability and virility of the company.

So far the publicity was of a general nature. It was now narrowed down to the customers of the company, who were given a definite offer to purchase preferred stock in the company either for cash or on partial payment terms. In the same envelope purchase order was enclosed. A day or two later a little booklet entitled "Ten Reasons Why I Believe the Six Per Cent Stock of the Southern Canada Power Company Is a Good Investment," was mailed to customers, and this was followed up a little later by a folder giving, for the last nine years, the number of customers and the assets and liabilities figures. The last and seventh piece of literature was a booklet, further accentuating the favorable financial and physical condition of the company, giving a few suggestions on how to judge an investment, pointing out that the yield on this offering was usually favorable and explaining that an employee would call. The last step was the personal call of the employee, which as already noted resulted in a considerable over-subscription of the stock offered.

Toronto Section A.I.E.E. Hold Smoker and Membership Night

A very enjoyable social evening was spent at the Engineers' Club Friday, Oct. 13th, by the Toronto Section of the American Institute of Electrical Engineers. The Institute has a membership of some 14,000 in different parts of the world with a Canadian Section of 700.

The musical programme was interspersed by interesting talks by local members. Mr. Frank Ewart of Toronto who is vice-president of the Institute described very graphically the aims and objects of the Institute. He pointed out, that although the advancement of the theory and practice of electrical engineering was the chief aim and object of the A.I.E.E., the membership was not necessarily restricted to men of technical education. He made it very clear that technical men need the co-operation and assistance of non-technical men engaged in the electrical industry.

Mr. C. E. Schwenger gave a brief outline of the proposed activities of the Toronto Section for the coming year, which will mainly consist of papers by prominent engineers.

Mr. A. H. Hull who is a past chairman of the Toronto Section gave some very interesting facts about the Journal. He drew attention to the very high standard of the editorial matter, and made particular reference to the magnificient library of technical books maintained in New Yory at the Institute's headquarters.

The musical side of the programme was supplied by an orchestra of the members of the section. Mr. Archie Ewart as violinist, Mr. Jack Robinson, saxaphone and Mr. Malcolm Wood, pianist. Major Jukes who has a very fine baritone voice rendered several songs. There was a record attendance of 170 and all enjoyed a very entertaining evening.

Montreal L. H. & P. Consolidated Petition for Tariff Revision

On October 5th, a petition was formally filed with the Public Utilities Commission on behalf of Montreal Light, Heat & Power Consolidated. The changes asked for involve a reduction of the charge for current from six to five cents per kilowatt hour, the abolition of the monthly minimum bill as well as the monthly meter rental, and the substitution of a monthly service charge of 50 cents per month per meter, for those using electricity only, and 25 cents for those using both gas and electricity, with sundry minor changes.

Sections 1 and 2 of the petition read as follows:—

1. "The standard of tariff rates presently in force for the supply of electric current for lighting purposes by the petitioners is as follows: Temporary contracts, 6 cents per k.w., monthly minimum bill, 50 cents, monthly meter rental, 15 cents: One year contracts, 6 cents per kw.h., 5 per cent. discount, net 5.7 cents, same minimum bill and meter rental; five-year contracts, 6 cents per kw.h., 20 per cent. discount, net 4.8 cents, same minimum and meter bills.

2. "The company petitioner is desirous of revising the said tariff of rates so as to reduce the base rate from 6 cents per kw.h. to five cents per kw.h., abolishing the monthly minimum bill, as well as the monthly meter rental, and substituting in the place of the two latter items a monthly service charge of 50 cents per meter per month in the case of electricity users only and 25 cents per electric meter per month in the case of dual service customers using both gas and electricity."

After setting forth the table of rates these changes will make, the petition asks that the proposed new rates be approved, applicable to all meter readings, on and after January 1, 1923.

Peak Load for Winnipeg Hydro

The Winnipeg Hydro will be getting its peak load about the middle of December for the year 1922. It is estimated that they will be delivering from Point du Bois 60,000 h.p. which is about 15% in excess of the peak load for 1921. This will leave the Hydro with 20,000 h.p. available for immediate sale, together with an additional 35,000 h.p. that could be developed, if required, in nine months.

Meeting of Toronto Chapter I.E.S.

The Toronto Chapter of the Illuminating Engineering Society held its first meeting of the society year on October 23, in the Engineering Building, University of Toronto. Prof. G. R. Anderson, the chairman, addressed the meeting and stated that this first gathering was more or less of a get-together nature, that plans for the year might be decided on. He then gave a short talk on the history of illumination tracing its development from the first crude oil lamps of the ancients. Several lantern slides were exhibited showing the improvements that have been made, up to the latest types.

Several of these latest types of lighting apparatus were on hand, and were demonstrated by Prof. Anderson. The Sheringham Daylight Unit was shown to be a color matching light, of such construction that the excess of red and defect of blue, characteristic of artificial light, are balanced by reflection. The accomplishment of the same result by using a suitable globe was also demonstrated. What may be called the latest type of arc lamp was shown in the "point light lamp." This is an enclosed tungsten filament lamp using direct current. The filament is of peculiar construction, two steps being required for starting. This lamp is used mainly for signalling. Other recent developments demonstrated by the chairman included the Neon lamp, a low current user, and bulb projector lamps. A mercury arc, and a searchlight of recent type were also shown. A very simple method of testing automobile headlights for glare, which has recently been brought out in England, was also explained; this method includes the use of a disc with irregularly shaped figures and the test is as to whether these can be distinguished at a certain distance from the car. Prof. Anderson concluded his address with this description and opened the meeting for discussion.

Several members present were of the opinion that an effort should be made to bring more of people like architects and electrical contractors, who actually install lighting, to the meetings of the society. Mr. G. G. Cousins stated that he thought the members of the chapter should do some missionary work, but their primary object was to educate themselves. Mr. Frank Groome came out strongly for the inclusion of as many as possible in the meetings of the society; he suggested more popular programs. Messrs. C. B. Stephens, J. Scott, W. Woods, D. C. Ferguson, Watson Kintner, and others also contributed to the discussion.

Canadian Electric Railway Association Activities

The Association's executive has appointed the following special committees:

Standards: G. Gordon Gale, Vice President and General Manager, Hull Electric Co., chairman; D. E. Blair, Superintendent of Equipment, Montreal Tramways Co.; E. P. Coleman, General Manager. Dominion Power & Transmission Co.; C. C. Curtis, Manager, Cape Breton Electric Co; W. G. Murrin, Assistant General Manager, British Columbia Electric Ry.

Public Relations: A. W. McLimont, Vice President, Winnipeg Electric Ry., chairman; G. Kidd, General Manager, British Columbia Electric Ry.; W. J. Lynch, General Manager, Quebec Railway, Light, Heat & Power Co.; E. W. Oliver, General Superintendent, Niagara, St. Catharines & Toronto Ry.; M. A. Pooler, General Manager, New Brunswick Power Co.

Safety: J. F. H. Wyse, General Manager, Ontario Safety League, chairman; C. C. Curtis, Manager, Cape Breton Electric Co.; W. H. Darracott, chief clerk to Manager, Winnipeg Electric Ry.; W. R. McRae, Superintendent of Rolling Stock and Shops, Toronto Transportation Commission; R. M. Reade, Superintendent, City Division, Quebec Ry., Light & Power Co.

It is proposed to appoint a special committee on the government classification of electric railway accounts, to deal particularly with maintenance and depreciation questions.

Sub-station for Montreal & Southern Railway

A contract has been let by the Montreal and Southern Counties Rly., to Nicholson Constructions Ltd., Montreal, for the erection of a sub-station building at South Kensington, Que. It will be built of cement, brick and steel, and its inside dimensions will be 16 x 28 ft. and 14 ft. high. There will be installed in it a 500 kw. rotary converter, the contract for which complete, has been given to Canadian Westinghouse Co. The company has also ordered a Wilson plastic arc rail bond welder complete with truck, from Ohio Brass Co., and 2 motor and 2 trailer interurban passenger cars from Ottawa Car Manufacturing Co.

Forest Fires Damage Northern Power Lines

The recent forest fires in Northern Ontario burned up many miles of transmission line in the mining districts. Service was, of course, interrupted, and the mines turned to whatever auxiliaries they had available. The main need was for power for pumping and lighting purposes, and for the agitators in the mills of some of the mines. In the restoration of service, power was first received at Kirkland Lake from Charlton. Linemen worked night and day on the damaged transmission lines, and on October 16, it was reported that all the Cobalt mines were working with all the power they required.

The street cars which have been discarded by the Toronto Transportation Commission are now the havens of many homeless families throughout the fire-swept districts of Northern Ontario. Eighty-seven have been shipped from Toronto. They are to be distributed as follows: Haileybury, 60; North Cobalt, 10; Charlton, 10; Thornloe, 5; Heaslip, 2.

Largest Turbine-Generator Unit Yet Constructed

The largest turbine-generator ever constructed in a single unit is now being built by the Westinghouse Electric & Manufacturing Company for the new Hudson Avenue Station of the Brooklyn Edison Company. The unit will have a rating of 62,500 kv.a., three phase, 60 cycles, 13,800 volts at 80 per cent power-factor. The operating conditions for the turbine will be 265 pounds steam pressure, 200 degrees Fahrenheit superheat, and 29 inches of vacuum. Two 70,000 square foot surface condensers, probably the largest in existence, are also being constructed by the Westinghouse Company for this new station. Each condenser will be served by two half capacity circulating pumps driven by two-speed induction motors. The air removal equipment will consist of Le Blanc air pumps and air ejectors.

The ultimate capacity of the plant will be eight turbine-generator units. Distribution will be at 27,600 volts, instead of at 13,800 volts as in the other New York power plants, because of the difficulty of getting out sufficient circuits with the limited street space. The switch house of the plant will use a vertical segregated phase arrangement of oil circuit breakers instead of the horizontal arrangement as at Hellgate and Calumet. Auxiliaries will be largely electrically driven, and a house generator will be used for supplying the essentials of auxiliary load. To insure continuity of service a careful study is being made of the various systems of supplying power to auxiliary busses.

The Application of Electricity in the Manufacturing Industry--9

Electric Logging a New Development in the Lumber Industry—Donkey Engines Being Replaced by Electric Motors—McFarlane Skyline System—Power Lines in Woods—Electric Rafting

The term logging, as generally used, refers to all bush operations. Such operations include the cutting of the timber and its transportation by various means to the pulp or sawmill. In this connection electricity has been used to some extent as a motive power, and its use is certain to become more widespread, as news of the success attending the present installations is disseminated. Lumbermen as a class are broad-minded and progressive and quickly adopt any device or method that is shown to be of proven worth.

Locality Determines Logging Methods

The conditions of logging vary greatly according to the locality. In some districts it is possible to cut the timber and float it down to the mill with very little trouble. In other localities the timber stand is at some distance from rail or water, and the logs are moved over ice or wagon roads to the skidways. These regional characteristics are a determining factor in the choice of equipment, and when a change is made to electrically driven apparatus, the engineer is generally called upon for a decision, which should only be given after a thorough study of conditions.

Logging With Donkey Engines

In the ordinary case, say where logs have to be moved a distance of a mile and a half to water, the old type of equipment includes two donkey engines. One is mounted as close as possible to the stand of timber, and drives a hoisting drum. A log is felled, it is hitched to a cable, which is wound up on the hoisting drum, and drawn as close as possible to the donkey. It may be then hitched to a longer cable and drawn by the other donkey engine over a long skidway to the water's edge. The first donkey operates up to around 3,000 feet, the second may have a haul of over a mile. Such a long cable, of course, runs over pulleys and the friction of the logs is reduced by the skidway. When electric power is used it simply means that the donkey engines are replaced by electric motors.

Logs Skidded With Electric Power

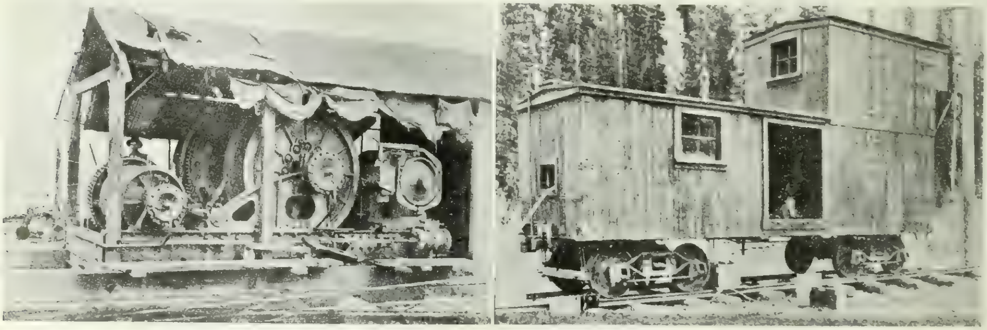
One of the first applications of this kind was made in 1918 in a locality, where the logs were first skidded down and then loaded on the cars of an electric railway. The yarder or hoist, used was a three-drum device, driven by a 200 h.p. wound rotor motor, using 10 cycle current. The car loader was driven by two 75 h.p. wound rotor motors. Both devices were mounted on a 60 foot sled, similar to a steam donkey sled, and it was noticeable that the three motors occupied only as much space as one steam donkey.

At first it was found difficult to obtain the slow speeds necessary. This trouble was overcome by introducing extra resistance into the phases of the motor, whereby great flexibility was obtained. Lumbermen were severe critics of the installation before it was operated, claiming that the sudden strain to which a yard engine is subject, as for example when a log strikes a stump or rock, would cause the motor to burn out. These proved to be false prophets, however, relays and outside resistance had been provided to take care of the excess current and there was no trouble on that score.

Skyline Logging

In one run of forty-four days this outfit handled 3,144,898 feet of logs, or an average of 71,474 feet per day. The average was later increased by adding to the transformer capacity, and ran over 77,000 feet per day. Another interesting installation was made in a country where the logs have to be removed from fairly steep hillsides. In this case the logging apparatus was of a special type, known as the McFarlane Skyline System, which uses a one and a half inch steel cable of which one end is anchored to standing timber on the crest of the hill, and the other fastened to the hoisting drum of the donkey. The cable may be carried out a distance of four thousand feet where the logs are of such a weight that they will not cause too great a sag. The logs are brought in by a carrier or trolley, and the entire hillside is cleared within its travel.

The motors used in this case are 150 h.p., 600 r.p.m., taking 60 cycle current at 550 volts. They are totally enclosed, and of heavy duty construction. Control apparatus



Left—Electrically driven log hoist; Right—Transformer car used in electric logging is mounted on the same sled, and consists of a seven point controller connected to a bank of resistance grids. This also operates the primary circuit, and the drive is thus self-contained. The operator has an ammeter in full view, and this together with a time element oil circuit breaker, shows him how far he can go with the cable. Another 7½ h.p. motor is used to operate a compressor which supplies air for the brakes.

Power Transmitted Through Woods

In this case power is transmitted at 11,000 volts from the sawmill power plant, which was 3½ miles from the logging operations at the time the installation was made. The line is run through the woods, using the trees as poles and runs at the logging end, into a portable sub-station, mounted on flat cars, as shown in the photograph. The sub-station equipment consists of 200 kw. oil-cooled transformers, which are protected on the primary side by expulsion fuses and horn gap arresters. The motors are supplied from the sub-station by a triple conductor, 000 cable, steel armoured and lead covered.

Average Power Input

A test was carried out on this installation, and it was found that running out light the carrier showed an average power input of 63 kw. When hauling in logs scaling 1,000 to 1,500 feet, the average power input was 104.1 kw. The same motor was used for hoisting logs on cars, and it was found that this required an input of 80 kw. In this regard, it may be pointed out that a 50 h.p. motor with light hoist would have ample capacity for loading logs on either rollways or cars. A separate installation of this size would effect a decided saving in time and power consumption. The application of solenoid load brakes makes it possible to do all a steam loader can do, and in addition to hold a log suspended in mid-air or in any position desired.

The Average Haul

For this particular installation, the average haul was found to be around 33,000 feet a day for one donkey. Latterly, certain improvements have brought the average up to 50,000 feet per day, and it is expected that this record will be maintained. The rate of haulage varies directly according to the speed of the trolley, and, of course, this can be increased—experimenting is now going on to determine limiting speeds. At first the rate of trolley travel was fixed at 1,000 feet a minute, but this has been increased to 1,200 feet per minute, hauling an average load of 1,700 log feet. The timber handled was white pine logs.

The owners of this electrical skyline installation are quite enthusiastic about it. They say that aside from the advantages of the skyline method, which keeps gravel out of the bark and prevents disasters to the saws, the electric apparatus saves time and worry.

Electric Locomotive in Logging

In localities where the area of cutting is some distance from suitable water courses, the felled timber is taken out on railway lines. The electric locomotive is almost ideal for handling this work because of its economy. Any logging locomotive is called upon to negotiate heavy grades and do a large amount of switching, which burns up a lot of fuel with steam as the motive power, because of the necessity of keeping good pressure up at all times. Another saving is made in the labor required, and in time required to get up steam, etc.

Electric Rafting

Electric power has recently come into use for rafting operations. The accompanying photograph illustrates the rafting and sorting ground of the Nashwaak Pulp and Paper Company on the Nashwaak River, N. B., where electric power is used for loading and sorting operations.

The logs arrive at this point after being driven down the main Nashwaak River. Here they are sorted and made up into rafts, which contain approximately 1,000,000 feet of lumber. These rafts contain a bottom layer of logs that float lengthwise of the stream, with others on top, crosswise. The illustration shows the raft loading apparatus. Current is carried out across the stream to the motor shed, which contains a squirrel cage motor. This motor drives a roller chain, which hoists and loads the loger. With this apparatus an average of 10,000 pieces per working day of nine hours was made.

Power Supply for Logging Operations

In many localities the logging camps are within reasonable distance of transmission lines and there is no difficulty in obtaining sufficient power from the central station companies. Power lines may be comparatively cheaply put up, as trees in the woods may be used for towers. Simplicity.

Rafting and sorting ground of Nashwaak Pulp & Paper Co.—10,000 pieces a working day are handled by the electrically driven roller chain with safety, is what is generally desired in this type of line and it has been found possible to erect a line of this description at a cost of less than $800.00 per mile.

The cost of power when supplied by central station companies varies within wide limits—one cent a kilowatt hour is a rate that works out at below $30.00 per horse-power per year for ten hour, 300 day operation. This figure is high, of course, for the majority of cases.

It will be found that many operators maintain a small mill near the site of their logging operations. In many cases the equipment is steam-driven, but the owner may be shown how the exhaust steam from the boilers will drive a turbine, and furnish enough power for the logging end of his business.

Results Secured by One Company

It is estimated by one company that a saving of 50 cents per 1000 on the cost of hauling timber is made by electric drive. This company in one year hauled 81,000,000 feet of logs and they figure a saving of over $28,000 on those operations.

Advantages of Electric Logging

The outstanding advantage of electric logging is in its elimination of fire risk. This is a point that is becoming of increasing importance, an argument that carries great weight. Other advantages may be tabulated as follows:—

1. The use of good wood for fuel is eliminated. It takes 1,000 feet a day to fire an engine.
2. Low maintenance costs. No replacing packing, grease caps, etc., and no boiler scale trouble.
3. Labor cost cut by elimination of firemen and woodcutters.
4. Electric plant is always ready and power is uniform, which is not the case with steam.
5. Personal equation of operator is reduced in importance. It takes a more skilled man to get the output and keep it up, on the donkey.
6. Higher speeds possible.
7. No water required. In some districts water for the donkey boiler has to be carried for miles.

The Field For Electrification

The majority of lumbermen who have seen electrified outfits at work are enthusiastic about this form of motive power. It is claimed that before long electric logging will receive official recognition because of the anxiety of governments to prevent forest fires.

The convincing argument is, of course, the fact that it costs less, output is increased, and lumbermen are willing to listen to arguments of this kind.

Canada has over 2,500 sawmills and there is some kind of logging outfit feeding nearly every one of them. The total capital invested in the lumber industry amounts to about $235,000,000, making it one of Canada's greatest industries. The adoption of electric drive wherever possible, is a feasible thing, one worth working for and easily capable of accomplishment, if lumbermen are shown what electricity will do for them.

The photograph herewith illustrates the skyline system of logging. The cable running to the distant hilltop is seen slanting away to the side of the photograph. Operations in this particular section are conducted on a large scale—some idea of the size of the work may be gained by comparing the men shown with the anchor tree. The huge logs shown in the photograph are all brought in, in this way. When it is considered that these are brought in at varying speeds up to 1,000 feet per minute (depending on the size of the logs) it is obvious that none but the stoutest and sturdiest apparatus can be used.

I'm Coming, Charlie!

This is the Only Possible Answer to the Invitations Being Broad-casted by the Big Convention Committee—Either be on Hand or Wire "I'm a Dead One"

The convention of Contractors and Dealers to be held in the King Edward Hotel, Toronto, on Monday and Tuesday, November 13 and 14 is an event you will long hold in your memory.

If you attend it.

If you don't attend, you will miss a lot of good merchandising ideas, to say nothing of the pleasure of meeting your friends. In that case, too, the strenuous work of the committee in charge, many of whom are giving practically their whole time to the preparation of the program, will have been in vain.

From this double viewpoint, then, we all owe it to this hard working committee, to the electrical industry and to ourselves to keep November 13 and 14 absolutely free.

"What is this wonderful program?", you say.

Well, it will aim at the root of our weakness.

The basic idea will be to teach the lesson of Better Merchandising. Hand-picked salesmen will demonstrate the most effective method of convincing skeptical customers that they should have this or that electrical appliance in their homes. This part of the program is already being rehearsed and some five or six model sales contests, are assured. The ideas contained in these demonstrations will constitute a valuable education for the man whose business it is to sell over the counter.

Then, it is planned to stage a most interesting play which portrays the daily life and habits of the electric merchant who has not yet caught the spirit of expert merchandising. The play shows the gradual evolution of this man until finally he emerges a real up-to-date successful merchant—a credit to the industry and a satisfaction to himself.

Also there will be papers and addresses. These, however, will be few and short, but there will be discussions aplenty. W. L. Goodwin will be in attendance. One of the biggest retail merchants in Canada will tell us the secrets of his own success. There will be a fine get-together banquet and a big dance. The King Edward assembly room is ideal for both. Sam. Hibben will demonstrate "Good Lighting."

Do we not owe it to the boys who are behind this convention to give them our support by attending the meetings and making our voices heard in the discussions?

A prominent educationalist in a recent platform address was outlining the qualifications of "a man":

It was not wealth.

It was not education.

It was not brains.

It was, rather, he who recognized his duty to the other fellows who were working toward the same ends as himself—public spirit, rather than private selfish interest.

Let us show Charlie Hopper and his committee of workers on November 13 and 14—and in the interval too—that there are a lot of "men" in the electrical industry.

BETTER MERCHANDISING

Let's Show Them

Christmas will be with us in about seven weeks.

The Christmas buying of electrical goods will begin in less than a month. Will you be ready?

Have you ordered your Christmas stocks?

Have you laid plans for getting in touch with your customers:—

By newspaper advertisements?

By letters?

By telephone?

By window displays?

By demonstrations?

By personal calls?

Do you realize:

That the hardware store, the furniture store and the drug store, are all working over time to grab the electrical business away from you?

This business is **naturally and logically—but not necessarily—yours.**

It will go to the merchant who makes the keenest effort.

Are we, in the electrical industry, going to sit down and watch our more aggressive competitors take the very food out of our mouths?

All-together—for the biggest Christmas effort yet.

Let's show the other trades that we're fast learning "How to Merchandise".

Results Follow Aggressive Methods of Pushing Christmas Goods

Methods That Resourceful Dealers Have Followed When Trying for More Holiday Business—Publicity the Needed Tonic—Windows Must be "Christmassy"

You don't have to spend a mint of money to get a lot of publicity for your Christmas campaign. The resourceful dealer will find ways and means of getting the attention of the public that cost very little.

To begin with, there are plenty of free helps available. Take window display material for example. This is generally good stuff and it pays the dealer to use it. Co-operate with the manufacturer as much as possible. It is a common occurrence to find the window display helps neglected under the counter,—perhaps they didn't just fit in when they came in, or the dealer was too busy to set them up—and we find a real sales help turned into a dead loss.

One ingenious electrical merchant hit upon the idea of having a good quality rubber stamp made bearing the words "Make it an Electrical Christmas—Buy Electrical Gifts at Jones' Store." This he stamped upon every piece of consumer electrical literature he could get his hands on, whether it was booklets describing washing machines, or letters setting forth the merits of vacuum cleaners or electric range literature, it was all one to him. At any rate he got enough together that he was able to put one in every house in his neighborhood. It is hard to estimate exactly what the effect of such publicity is, but it is certain that it directs the eyes of the public towards Jones' store as a medium for purchasing Christmas gifts.

In some of the smaller places the old stunt of colored lantern slides in the cinema theatres can be worked to good advantage. It pays to have the slides well made, and they should have a Christmas atmosphere. One slide that looked very well last year showed a conventional Santa Claus with the wording "The Bon-Ton Electrical Store—Headquarters for Electrical Gifts—The best Christmas Presents—See Our Special Display."

One live dealer hit upon the plan of using a small Christmas tree in his delivery truck. This truck is also used for wiring jobs, and wherever it goes through the city, it carries the tree with a sign attached to it, telling the Christmas buyers where to get the best Christmas presents. This device has attracted a good deal of attention and this dealer says that many of his customers remark on the novelty of the device.

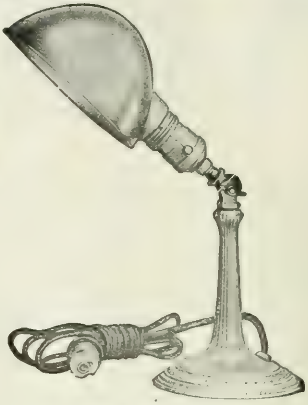
Another good plan is to offer some electrical gift as a prize among school children for the best essay or oration on "Why Electrical Devices are the Best Christmas Presents." This plan requires a good deal of working up, the securing of competent judges, and altogether the expenditure of some time and money. It is worth while if properly carried out.

A word in regard to Christmas windows. It is well to get away altogether from the type of window you have been using all year. Give the display a Christmas atmosphere at all costs. There are some good window types shown elsewhere in this issue, that you can adapt to your particular needs. The display of a variety of articles is desirable at this time, and it is a catchy idea to use a card with each, lettered "For Father", "For Mother", and so on, right through the whole list you have available. Fireplaces, Christmas trees and so on are easily placed in the window and there is a great deal of difference between the effect produced by a cold, warehouse type of window, and the warm, Christmassy type that shows a Christmas spirit.

Christmas

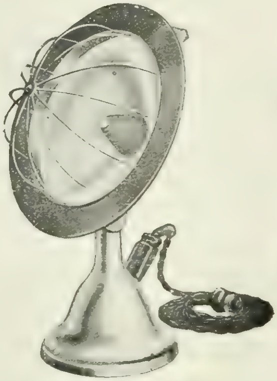
Table Lamp—C.G.E. Co.

Iron and Tongs Heater

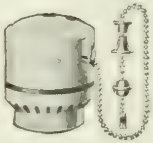


Utility Lamp—C G E. Co.

Table Lamp—Northern Electric Co



National Air Heater



Ceiling Light Receptacle—Pass & Seymour Inc.

Bedroom Shade

Art Lamp American Doughboy

Perfume Lamp—Fulper Pottery

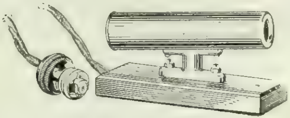
Floor Lamp—Northern Electric Co.

Christmas

Table Lamp

Waffle Iron—
Majestic Electric Development Co.

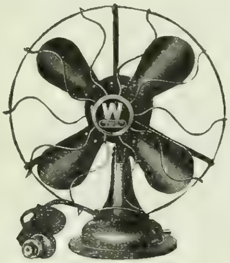
Electric Range—Westinghouse Co.



Curling Iron Heater—
Opal Electric & Mfg. Co.

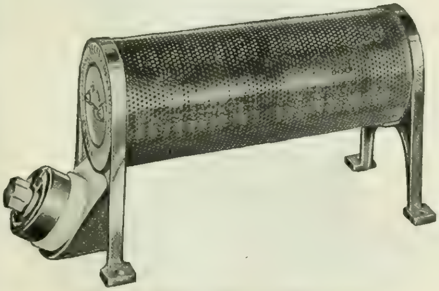
Duplex Table Outlet—
Arrow Electric Co.

Percolator—Westinghouse Mfg Co.



Electric Fan—Westinghouse Co.

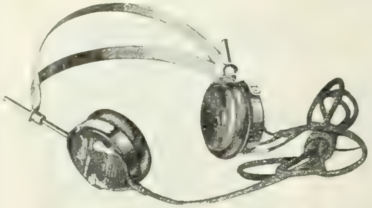
Chafing Dish



Heater—National Electric Heating Co.

Electric Floor Waxer—Canadian Floor Waxer & Polisher Co.

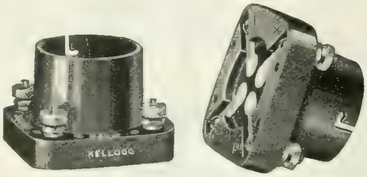
Christmas



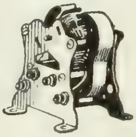
Headset—National Electric Heating Co.

Flashing Plug—
Betts & Betts

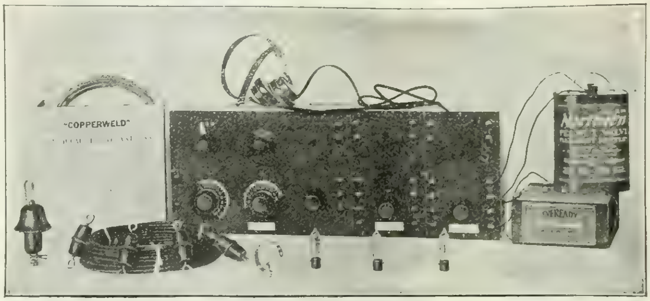
Loud Speaker—Northern Electric Co.



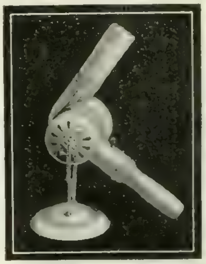
Kellogg Molded Tube Socket



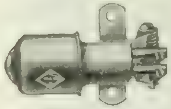
Toy Motor—
Gilbert-Menzies Co



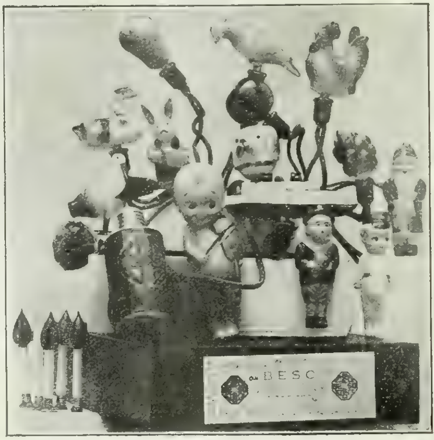
Northern Electric Receiving Set



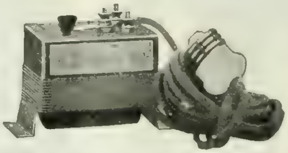
Hair Dryer—
Hamilton Beach Mfg. Co.



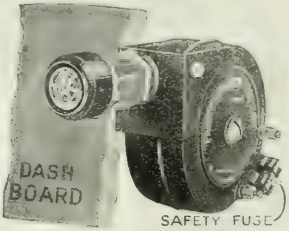
Pilot Lamp—
Culver Stearns Mfg Co.



Betts & Betts Christmas Tree Unit



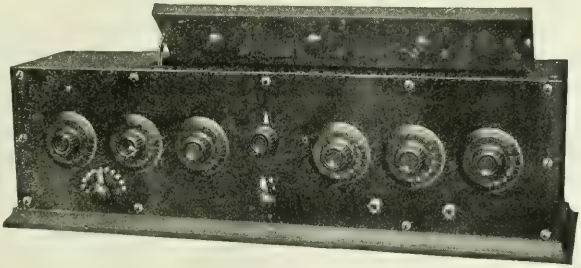
Vim Toy Transformer—Betts & Betts



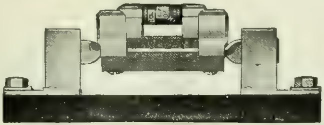
Cigar Lighter and Cord Winder—
Metal Specialties Mfg. Co.

Christmas

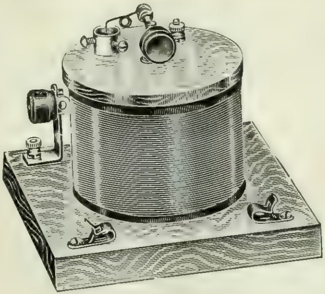
Radio Set—C.G.E. Co.



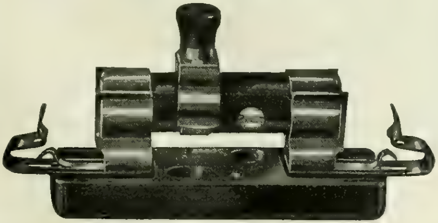
Gilbert Menzies Receiving Set



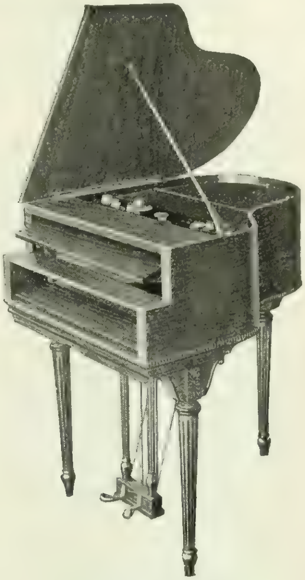
Lightning Arrester



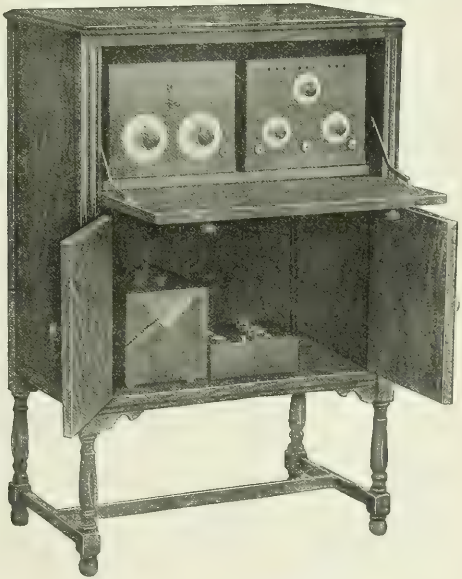
Rittenhouse Crystal Set



Arrestor—Fernando C. Mesa Co.



A Novel Receiving Set



Cabinet Receiving Set

A list of Electrical Items suitable for Christmas Presents for every member of every family

General Servants in the Home

- Two-way socket
- Candle socket
- Electric heating pad
- Bell ringer
- Bath heater
- Cereal cooker
- Casserole
- Chafing dish
- Chocolate and cream warmer
- Electric churn
- Clothes drier
- Clothes washer
- Coffee grinder
- Coffee percolator
- Combination cooker
- Corn popper
- Cream whipper
- Dish washer
- Disc stove—one element
- Disc stove—two elements
- Drink mixer
- Egg boiler, cooker or steamer
- Electrically heated blanket
- Egg tester
- Electrically heated faucet
- Fan
- Fireless cooker
- Food warmer
- Fruit and vegetable peeler
- Frying pan
- Fumigator
- Gas lighter
- Griddle
- Hand lamp
- Hot closet
- Hot plate
- Ice cream freezer
- Illuminated porch number
- Immersion electric heater
- Iron
- Ironing machine
- Lemon squeezer
- Meat chopper
- Meat slicer
- Milk warmer
- Plate warmer
- Radiator
- Range or stove
- Refrigerator
- Regulating lamp or socket
- Sauce pan
- Wired serving table
- Sewing machine motor
- Sewing machine portable lamp
- Stew pan
- Sterilizer
- Table cooking set
- Table lamp
- Tea ball pot, kettle or urn
- Tea wagon, electrically fitted
- Toaster
- Toaster-stove
- Utility motor
- Vacuum cleaner
- Waffle iron
- Water purifier
- Water heater
- Water kettles
- Wired dining table and other furniture
- Appliance cord suspender
- Isolated plant
- Air heater
- Electric grate
- Candlestick adapters
- Perfume burners
- Luminous Pendants
- Intercom. telephones
- Samovar
- Hair dryer
- Electric clock systems
- Electric fireless cookers
- Floor lamps

Mostly for the Young People

- Aeroplane
- Automobile
- Circuit breaker
- Crane and hoist
- Dynamo
- Electric boat
- Electric engine
- Electric range
- Fan
- Ferris wheel
- Utility motor
- Hydro-electric generator
- Lamp post
- Electric locomotive
- Motor and countershaft
- Power station
- Electric railway outfit
- Steam engine and dynamo
- Telephone
- Toy magneto
- Electric train
- Transformer
- Trolley car
- Books on electricity
- Picture and post card projector
- Motion picture machine
- Shock coil
- Battery
- Battery lantern
- Flashlight
- Electric fountains
- Pistol flashlight
- Bicycle light
- Canoe lamp
- Electric candle
- Christmas tree lighting outfit
- Bird, fruit and nut lamps
- Miniature incandescent lamps
- Electric scarfpin
- Battery fan
- Horseshoe magnet
- Magnet charger
- Telegraph instrument
- Baby flatiron
- Nursery light
- Toy washing machine

Radio Accessories

- Indoor aerials
- Insulators
- Amplifying transformers
- Charging outfits
- Crystal detectors
- Phone condensers
- Lightning arresters
- Antenna wire
- Ground switches
- Loud speakers
- Rheostats
- Head sets
- Tuning coils
- Vacuum tubes
- Complete sets
- Variocouplers

A feature of Electric goods, often overlooked, is that they are used every day in the year

Electric Conveniences and Luxuries

Alarm clock
Battery lantern
Bed lamp
Burglar alarm
Candlestick
Chair lamp
Cigar lighter
Comb and curling ironer
Curling iron
Curling iron heater
Desk companion
Desk fan
Desk lamp
Electric fountain
Electric humidifier
Electrically lighted wall mirror
Electrically lighted table clock
Floral decorations
Flower basket
Foot warmer
Hair drier
Hair waver
Hand lantern
Heating pad
Hearing devices
Floor lamp
Illuminated pads and pencils
Illuminated table ornament
Library lamp
Lighted aquarium
Luminous switch plate
Massage vibrator
Novelty electric candle
Oil lamp attachment
Lamp shades
Piano lamp
Portable radiant heater
Reading lamp
Reed or wicker portable
Reminder clock
Illuminated shaving mirror
Shaving mug
Shaving water heater
Silk lamp shade
Talking machine motor
Traveler's iron
Traveler's companion
Traveler's stove
Traveler's lamp, cord and plug
Vest pocket flashlight
Watch case flashlight
Writing desk lamp

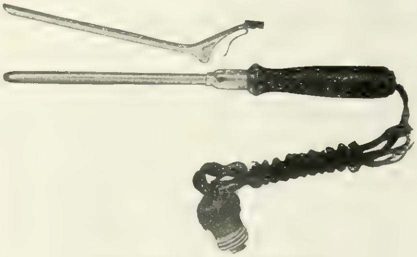
Invalid and Sick Room Comforts

Bath cabinet
Bed lamp
Body, joint and limb bakers
Candle or night light
Deodorizer
Ceiling clock
Electrically heated blanket
Electrically heated cap
Electrically heated garment
Electrically heated pillow
Foot warmer
Heating device
Heating pad
Medical battery
Medical coil
Medicator
Milk bottle and food warmer
Motor chair
Nurse signal
Obesity apparatus
Sterilizer
Therapeutic lamp
Treatment apparatus
Vibrator
Violet Ray apparatus

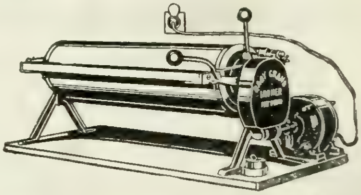
Electric Automobile Fittings

Battery lamp
Clock
Foot warmer
Lamp kit
Signal bell
Signal lights
Trouble lamp
Cigar and pipe lighter
Electric horn
Electrically heated gloves
Engine and radiator heater
Garage and tire pumps
Garage portable lamp
Headlight dimmer
Headlight glare diffuser
Headlight voltage regulator
Hydrometer for battery testing
Inspection lamp and magnet
Limousine annunciator
Limousine cluster light
Limousine telephone
Limousine radiator
Pocket testing meter
Signal gloves
Spark plug
Spark plug intensifier
Spark plug tester
Steering wheel warmer
Spotlight
Storage battery
Storage battery tester
Vulcanizer

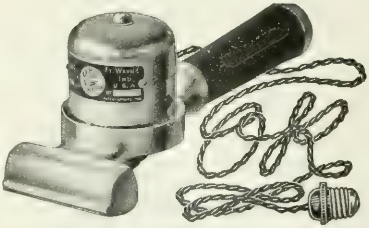
Christmas



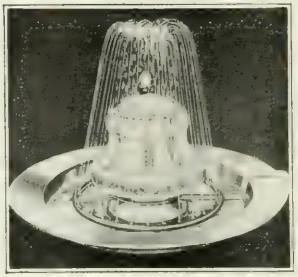
Curling Iron—Northern Electric Co.



Electrically Heated Ironer—Ingersoll Machine & Tool



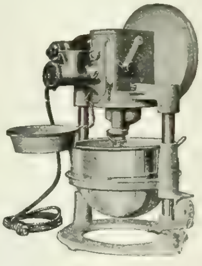
Hand Vacuum Cleaner—Wayne Machinery Co.



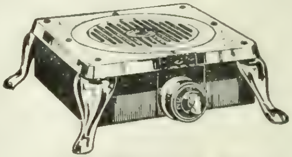
Humidifier-Ingersoll Electric Products Co

Trouble light—Grigsby Grunow-Hinds Co.

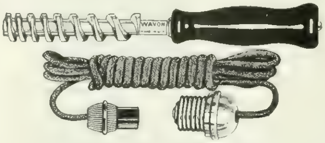
Heating Pad—Ingersoll Electric Products Co.



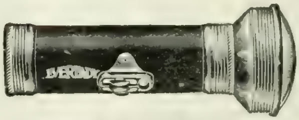
Mixonette—Read Machinery Co



Utility Heater—C.G.E. Co.

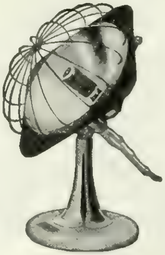


Wavon—Frank W. Morse Co.

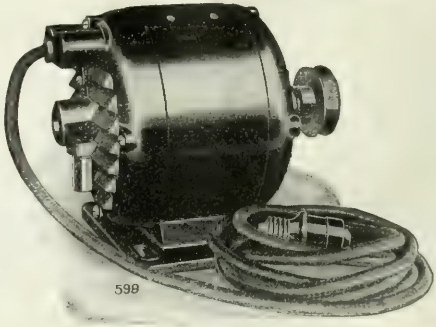


Eveready Flashlight

Hair Dryer—Wisconsin Electric Co

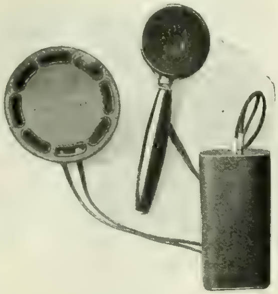


Air Heater—C.G.E. Co.



Robbins & Myers Utility Motors

Christmas

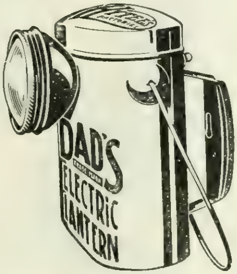


Acousticon—Dictograph Product Corp.

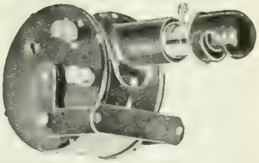
C.G.E. Co.—Percolator

Art Lamp—Fulper Pottery

Travelling Outfit—C.G.E. Co.

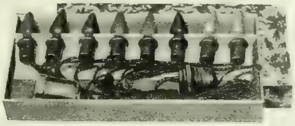


Portable Lantern—Dad's Factories

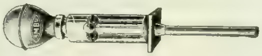


Trouble Finder—
Cincinnati Specialty Mfg. Co.

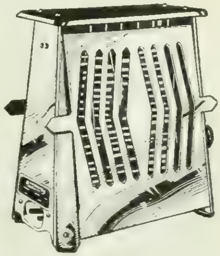
Radio Set—Custer Specialty Co.



Christmas Tree Lights—C.G.E. Co.

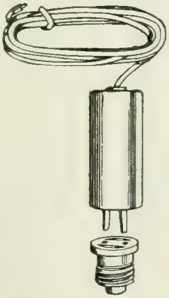


Battery Tester—
American Bureau of Engineering



Toaster

Bicycle Light—Dad's Factories.

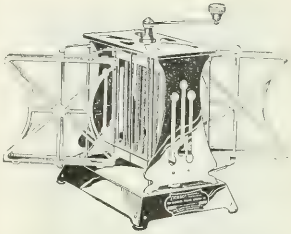


"No Aerial" Plug—
F. E. Garrett Co.

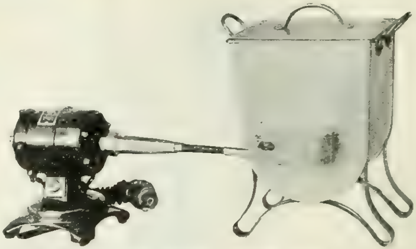
Electric Percolator—C.G.E.

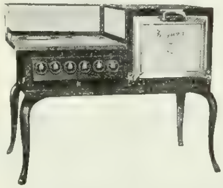
Focussing Searchlight—Diamond Elec. Specialties Corp.

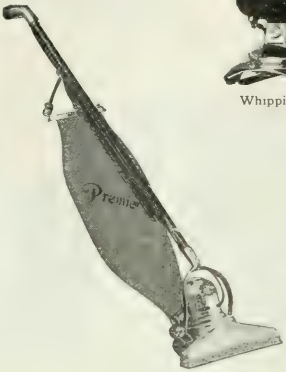
Christmas


Toaster—Perfection Elec. Products Corp.

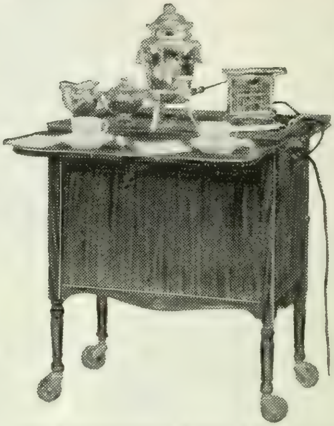
Electric Grill

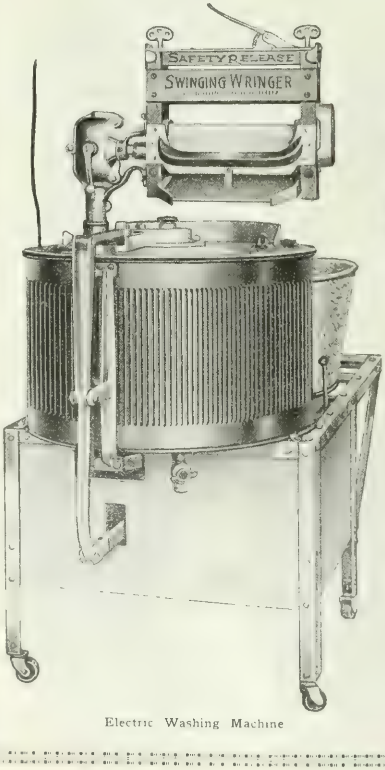

Whipping Machine—Racine Universal Motor Co.


Electric Range—C G.E. Co.



Vacuum Cleaner


Wired Table—Nichols Electric Furniture Co.



Electric Iron—C.G.E. Co

Hot Plate—Central Flatiron Mfg. Co.

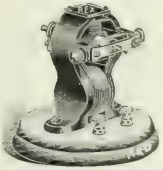
Soldering Iron

Electric Washing Machine

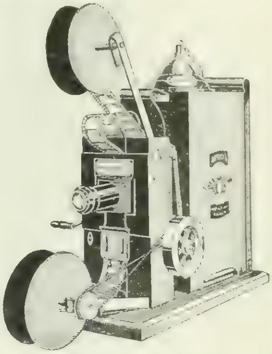
Portable Lamp

Christmas

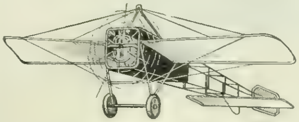
Phono-Set—Gilbert Menzies Co.



Motor—
Kendrick & Davis Co.

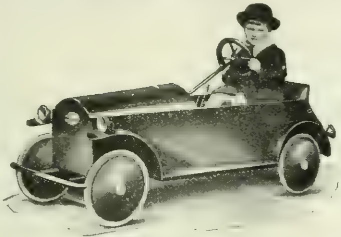


American Pictograph Co.

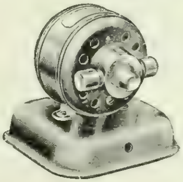


Rittenhouse Aeroplane

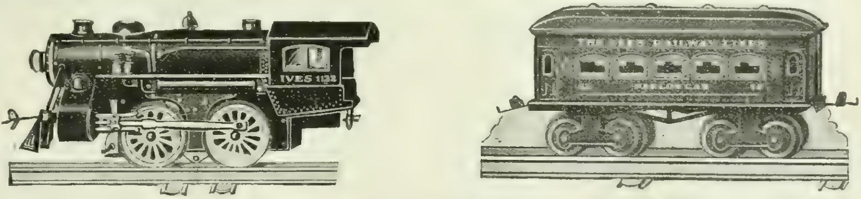
Rittenhouse Transformer



Custer Cootie Car

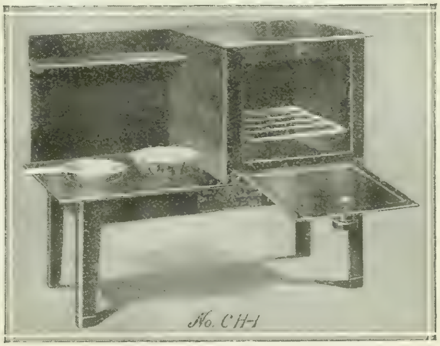


Motor—Gilbert-Menzies Co.



Electric Trains—A. C. Gilbert Menzies Co.

Perfume Lamp—Fulper Pottery



Toy Range—H. G. Wells Mfg. Co.

Cinderella Up-to-Date

Creating Electric Christmas Atmosphere

Here is an Attractive Little Play, Especially for the Young, That May Well be Made a Feature in School or Church Christmas Entertainments[*]

THIS pantomime has been written for the use of central stations, electrical leagues, electrical shows, electrical conventions, manufacturers, or retailers, as a picturesque demonstration of the standard electrical household appliances.

The cost of production will be small, considering that manufacturers, jobbers and others will in all probability combine and appropriate advertising funds to the financing of the show.

It is suggested that this pantomime adapted from the story by the Grimm Brothers, be played by very small children actors. The first purpose in using children is to show how simply and easily the electric household utilities used as properties may be operated. Then children actors are so much more natural, in the majority of cases, than grown ups; they subordinate themselves more readily, and make a fresher and so a stronger appeal to jaded audiences.

The combination of the third oldest fairy tale in the world, with the display of modern electric devices, which only a short time ago were marvels to the most blase among us, makes a study of comparison and invests each the other with romance. The object of the producer is to keep the romance and accentuate the magic of electric service.

There are only two stage sets used in the pantomime. They are In the Kitchen of Cinderella's House and On the Grand Staircase of the Palace. Both sets are used twice. In the former set the walls of the kitchen should be made to represent old panels, and arranged so that certain panels may swing or slide open and shut at the touching of electric buttons, to reveal the electric appliances working busily behind them. Double walls are of course used in this set, between which the electric machines are placed. The smallest models of the machines should be used. They include an electric range, a washing machine with wringer, an electric iron, an electric dishwasher, an electric cleaner and a phonograph.

A suggestion is that merchants might have their advertisements thrown by lantern slides upon screens at either side of the stage. while products are being introduced and demonstrated in the play.

A production committee would consist of a business director, an advertising director, the play director or coach, a stage manager, a property man, a costumer, and above all an electrical director.

The duties of the producing committee are these:

The Director is a responsible head; someone preferably who knows something about theatrical work. This director must be blessed with some imagination, that he or she may discover and direct the imagination of collaborators and actors. The director in Cinderella's House may very well be a woman; it must be someone capable of assembling and casting the actors in their parts. This director, with the electrical man, must determine where the principle lighting must come from. In the second scene, the grand staircase, an elaborate display of lighting effects may be made. It would also be more effective in the third scene to have this set in darkness, when Cinderella is changed back to her rags; using a spot light on her. Orchestrated phonograph music will be necessary in these scenes.

Stage manager and property man may be

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[*] Courtesy Society for Electrical Development

combined in one person if necessary; but the greater the number of persons concerned in an amateur production, the greater the interest aroused.

The stage manager is responsible for the stage being properly set; for the actors being at their entrances on time.

The property man must see that everything used in the pantomime is in its place. In this instance, he must work in co-operation with the electrical director.

The electrical director must be a practical electrician, who will see that electrical properties are in working condition; that all electrical installations are perfectly made; that every switch and every outlet and every appliance is in the most exquisitely perfect order. There must be no failures in this equipment.

The costumer will design and superintend the making of costumes. In the ballroom scene there is ample opportunity for some beautiful effects.

The business director will manage the financing of the production; the expenditures of money for all purposes.

The advertising manager will see that the show obtains all possible advertising. He may appoint if desired a director of publicity, who will handle the stories to be written for local newspapers; the announcements made through organizations such as womens' clubs, etc. This publicity director may call personally upon newspaper editors, announcing the preparation of the production, giving names of people back of its production, the names of those doing the actual work, of the children taking part. Editors will then signify whether stories of the show are to be written by the publicity director personally or whether reporters will be assigned to cover the work. It is always safe however, to get continuous information into the hands of editors; each new development or occurrence of interest in the preparation of the show may be made into interesting newspaper stories, which all help to swell the advertising your production is obtaining. Pictures of actors, in costume if possible, should accompany these stories.

The effects of this picture on the future audiences must be kept carefully in mind throughout the work of preparation. Remember this audience consists of the people you wish to convince of the charm and utility of doing it electrically.

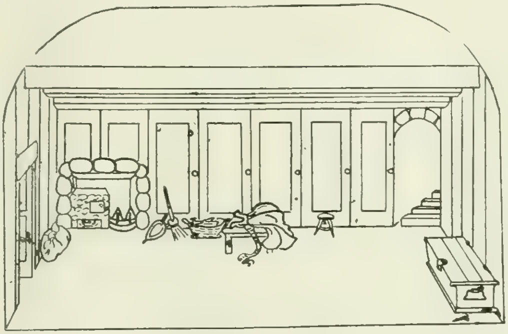
SCENARIO OF THE PANTOMIME

Act I, Ssene I

In the Kitchen of Cinderella's House

THE walls of this old-time kitchen are dingy oak panels and the floor of worn stone. Like most old English kitchens, this seems to be the living room of a poor family. At the back (right) is a great open fireplace, with electric logs, and a stone oven which food is cooking in kettles. The logs are but smouldering, and among the ashes scattered in disorder on the hearth are two great flatirons, too heavy for the small drudge Cinderella who is struggling back and forth to her sisters' finery which is arranged upon the table. The only other article of furniture in the room beside the table and two stools is an old chest in a corner.

Cinderella is barefooted and ragged and drags her feet wearily as she walks to and fro with the irons. She must frequently resort to the ancient pair of bellows on the hearth to fan the flame of the logs into action. In the back wall (left) is a closed door that leads by two steps to the other part of the house.



1. The Kitchen of Cinderella's House

Pots and pans and dirty crockery are scattered about and there is a bundle of soiled linen among the chaos.

Cinderella scorches the finery she is pressing. She appears frightened at her misfortune and weeps. She then attempts to remedy the scorch by rubbing it with a wet cloth.

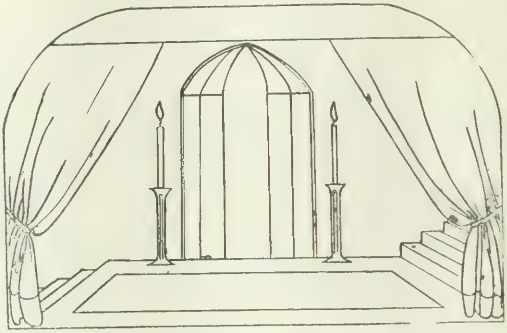
The two Haughty Sisters enter from the house door. They are in a great flutter over their preparations to attend the great ball and express their anticipated grandeur to each other, growing quite excited and jealous at the explanation of the different toilettes. Looking about they show their disgust at the disorderly kitchen and begin to jerk Cinderella about, point to the soiled linen and utensils, and threaten her. They examine their finery. The eldest sister discovers the scorch and slaps Cinderella, who runs and falls among the ashes weeping.

The sisters go out into the house with their finery. The room grows dark. The light from the electric logs slowly grows brighter and the Fairy steps from out the flame. Her wand is tipped with an electric radiance. Cinderella falls back, watching the Fairy in amazement.

The Fairy lifts the little girl, comforts her tenderly and escorts her about the room, showing her magic spots upon the walls which she creates by a touch of her wand. She explains in dumb show how Cinderella may operate their magic power when she has use for them.

The Fairy disappears.

Cinderella rubs her eyes and pinches herself to see if she is dreaming. She creeps to the door through which her sisters have disappeared and listening a bit to see if they are engrossed in their dressing, she does the door softly and presses the first button the Fairy has shown her. The walls swing open, revealing an electric stove. She places the food from the stone oven on the electric stove and soon it is steaming away merrily. She closes it into the wall and pressing the second button brings out an electric washing-machine, with its attachments, into which she tumbles the soiled linen, closing it up into the wall again. A third button brings out an electric dishwasher in which she arranges the dirty crockery and pans, closing it back again to do its work. A fourth button brings out a vacuum cleaner with which she cleans the room, placing it in the wall again when she has used it. She then arranges the clean dishes from the dishwasher upon the table and passes the snowy linen from the washing machine, through the wringer into a laundry-basket. She places the food from the electric stove in the dishes on the table. Bringing the laundry basket of nicely washed linen out into the kitchen, she closes all the magic closets of the wall up again.



2 On the Grand Staircase of the Palace

The Haughty Sisters enter and are astonished at the shining brightness of the clean kitchen and the basket of laundry. They are too much interested in themselves, however, to think of anything else very long. They preen themselves in their ball room finery, while they gulp down their food. With admonition to Cinderella to stay at home and mind the house they disappear out the entrance door.

Cinderella gazes wistfully after the departing sisters and then goes slowly to her laundry basket of snowy linen. A fifth button pressed brings out the ironing-board and electric ironer, and Cinderella is soon busy pressing the linen.

Suddenly the little girl pauses in her interested movements and stands thinking. She runs to the old chest and pulls some old finery out and examines it. She begins pressing this garment with the smoothing iron and soon holds it out fresh and fluffy. With great excitement she dives into the chest again and produces a pair of shining slippers to match the frock, then disappearing into the next room reappears almost instantly dressed in her finery. She walks about the room looking closely at the spots her Fairy had touched, and discovers the sixth button. Pressing this she listens and is joyfully amazed to hear the low deep notes of a motor horn. A chauffeur in trig livery steps through the entrance door and appears before her magically. He touches his cap and stands as if awaiting orders. Cinderella runs to look out the door and then claps her hands for joy. She goes out followed by the chauffeur.

(Curtain)

End of Act I, Scene I

Act II, Scene I

On the Grand Staircase of The Royal Palace

A LANDING of the grand staircase occupies the entire stage with steps ascending at the right and continuing at the left. At the back side of this landing a view of the ballroom is given through a large open window draped with vines and flowers and through which the dancers may be seen. floating by to the accompaniment of orchestrated music from phonographs.

Guests at the ball walk up the stairs sometimes pausing to chat in groups.

Cinderella enters from below and slowly ascends the stairs. She walks slowly to the middle of the landing. A little page runs before her and hastens up the stairs.

The guests on the landing watch Cinderella in wonder. The little page enters, tumbling down the stairs before the Prince, who expresses his admiration, bowing low before the mysterious stranger.

The Prince escorts Cinderella on up the stairs and out.

(Curtain)

End of Act II, Scene I

Act II, Scene II

The Same as Act II, Scene I

THE music still plays. The dancers still float by the window on the staircase. The stair itself is deserted.

Cinderella appears running down the stair and onto the landing. The Prince runs after her. They stop on the landing and he is beseeching her not to leave. She turns to speak to him. From somewhere bells chime the hours of twelve. There is a sudden flash of light and the scene is in darkness. When the lights go on again Cinderella in her old rags is seen flying down the stairs. The Prince stands staring in amazement. Other guests run down the stair onto the landing and point to the ragged girl disappearing in the darkness. The Prince stoops to pick up a little slipper left where his charmer had been standing and shows it to the others.

(Curtain)

End of Act II, Scene II

Act III, Scene I

In the Kitchen of Cinderella's House. The morning after the ball. The kitchen has an orderly aspect. In place of the oven the electric stove occupies the fireplace. In the place of the old table there is a new one, which is a case for a phonograph. The freshly pressed linen is lying in an orderly stack on the table; Cinderella enters from the house in a fresh house frock and glancing warily about to see if her sisters are near, appears much relieved and presses the button of the table phonograph. It begins to play a merry waltz and the little girl dances around to the music, touching the magic buttons and peeping into the secret closets where her electric wonders are concealed. Hearing her sisters approaching she shuts the music off and goes to sit on the hearth.

The sisters enter. They are much too excited by the happening of the mysterious stranger at the ball the night before, to notice the kitchen. They pay no attention to the little girl who takes the mate to the lost slipper from her pocket and looks at it sadly.

The eldest sister, going to the entrance door, calls her sister excitedly to note a crowd approaching the house.

A royal page enters and bowing before the sisters presents them with the royal decree pertaining to the search being made by the Prince for the owner of the slipper. The sisters nearly tear the parchment containing the decree to pieces in their efforts to see it first. Cinderella sits in her corner unobserved. The Page goes out and the sisters begin a dumb show altercation as to which one the slipper will fit and which has the smallest foot. They dispute with heads, hands and feet. They rush from the room into their dressing room, quarreling and gesticulating.

Cinderella listens at the door through which her sisters have disappeared, looking at her slipper. She slips it back into her pocket just as her eldest sister rushes back out the door, seizes her and drags her to the table, beneath which she thrusts her, pulling the laundry down around her. The eldest sister rushes out again. The Prince enters from the outside with several members of his court, followed by excited villagers. The Haughty Sisters return, dressed in their finery and give themselves great airs as they sit down to have the slipper the Prince is carrying, tried on their feet by the page. The slipper will fit neither one of the sisters and the eldest one, greatly disappointed, seizes a kitchen knife at hand and attempts to cut off her heels and toes in an effort to crown her foot into the slipper.

Suddenly mysterious music begins to sound from the table and a voice sings: **"You may cut off your heel and cut off your toes but under the table the slipper goes."**

The guests are startled, but the Prince insists upon investigation, and soon drags Cinderella out from beneath the table. The Prince tries the slipper upon Cinderella's foot, in spite of the rage of her sisters.

The slipper goes upon Cinderella's foot smoothly. She produces the mate to it from her pocket. The Prince falls to his knees and kisses her hand. The Haughty Sisters rush from the house in their jealous rage.

Cinderella goes about the kitchen, on the arm of the Prince showing the magicial machines that have so influenced her fate.

(Curtain)

End of Cinderella's House

Cinderella's House

A COMBINATION OF THE THIRD OLDEST FAIRY TALE IN THE WORLD WITH A SERVICEABLE DISPLAY OF MODERN ELECTRICAL DEVICES STAGED AND PRODUCED BY

*(here insert your name)**

IN THREE ACTS AND FOUR SCENES

Characters in Pantomime

CINDERELLA ....
The Fairy ....
The First Proud Sister ....
The Second Proud Sister ....
The Chauffeur ....
The Little Page ....
The Prince ....
Dancers at the Ball ....
Courtiers, attendants, villagers ....

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* A printed program on a small sheet of pink or blue paper announcing the Pantomime and giving the cast with the names of the children playing the different roles will help to stir up much interest in the production. On this announcement may go the names of the company, firm or organization staging the Pantomime and the names of the Committee, patrons, etc.

Winnipeg Electrical Men Start Strong Campaign to Boost Electricity

The electrical men of Winnipeg are running two or three page electrical sections, regularly. These pages contain about five columns of advertising and three pages of editorial matter dealing with the advantages to be derived from the greater use of electricity. Each week features two or three lines only, for instance October the 7th issue dealt with ranges, air heaters, and water heaters; October the 14th with washing machines, electric grates, and commercial illumination; October 21st with ranges, table appliances and air heaters, and October 28th with residental illumination. A committee has been formed comprising Messrs. Deering, Howard, and King, who have taken charge of the section.

In order to arouse interest in these pages, the Winnipeg Electrical Contractor-dealers' Association have offered $500.00 in electrical appliances for a slogan that will express the objects and service of their association. The prizes offered are as follows:

1st prize....Westinghouse electric range. installed in home.
2nd prize....Community electric washer.
3rd prize....Northern electric radio set.
4th prize....Hot Point electric table set.
5th prize....Universal electric vacuum cleaner.
6th prize....Moffat electric grate.
7th prize....Star water heater & wiring.
8th prize....Electric air heater.

The objects of the association are outlined in the advertising as follows:

1—To further the developments of the electrical industry in Manitoba.
2—To combine safety, convenience and reliability in the application of electricity to homes and commercial institutions.
3—To maintain a high standard of business ideals amongst electrical dealers.
4—To create a high standard of workmanship in electrical installations.
5—To give to the public the benefit of their experience in the latest developments of the electrical industry.
6—To place their guarantee behind all the goods they sell and the work they do.

The contest is open to anyone, and there is no limit to the number of slogans sent in; the contest closes at midnight December 23rd, 1922.

Both the Winnipeg contractor-dealers, and the Manitoba Electrical Association have voted a substantial sum of money to be used for advertising purposes, and these organizations will advertise alternate weeks, taking a quarter page or thereabouts every Saturday. In order to keep the advertisers posted as to what future issues will feature, a schedule for the next three months has been printed and distributed to the various electrical firms in Winnipeg; this card also shows the advertising rates.

The editorial matter in these sections is worthy of comment, as it is of a highly educative nature. The following are a few of the headings that appear in the Electrical Section:

Show Refinement in Room Lighting.
Application of Electric Heat in Industry.
Electric Water Heaters; High and Low Temperatures.
Electricity Blessing to Modern Woman.
Installation of Electric Outlets.
Health Value of Electric Washer.
Woman's Place is in the Electric Home.
Facts about Portable Heaters.
How One's Home should be Lighted.
Many Advantages to Electric Iron.
Important Points to be considered in purchasing of Electric Washer.
What the Winnipeg Electrical Contractor-Dealers Can Give.
Transferable Light Fixtures Featured.
Always Supply of Hot Water.
Getting Husbands to Wash Dishes.
Proud Boast of City House Owner.
Importance of Properly Lighted Show Windows as Lure for probable Buyers.

It is pleasing to state that the Winnipeg dealers are already beginning to trace direct results from their advertising; for the convenience of those advertisers who are not familiar with writing advertising copy, every assistance is given them by the committee.

In the advertising copy of the Electrical Contractor-dealers' Association, they give the names and addresses of all members of their association, and strongly advise the public to patronize the legitimate dealer, and not take chances on the irresponsible casual contractor as, if you do, nine times out of ten you are liable to have faulty work done and eventually find it necessary to call in the legitimate dealer and have the job done again. It is always cheapest in the long run to call in skilled help in the first place.

What Future Advertisements Will Feature

November 4th—Washing Machines, Ironing Machines and Water Heaters.
November 11th—Vacuum Cleaners and Radio.
November 18th—Ranges and Illumination, Commercial.
November 25th—Washing Machines, Radio and Table Appliances.
December 2nd—Telephone and Ranges.
December 9th—Illumination, Residential; Vacuum Cleaners and Water Heaters.
December 16th—Table Appliances and Ranges.
December 23rd—Vacuum Cleaners and Table Appliances.
December 30th—Table Appliances and Water Heaters.

The Baby Grand

The Baby Grand Ironer is finding a good field in Winnipeg, according to reports from Mr. F. E. Garrett. He states that the Winnipeg Hydro has created a great deal of interest through the efforts of Mr. W. T. King, publicity manager of the Hydro. One of the features of this ironer is that it does not require and special wiring; therefore there should be a good demand for it in the Prairie Provinces.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Royal Vacuum Cleaners

The Continental Electric Co. of Toronto, who are manufacturers of the Royal vacuum cleaner, are putting on a sales campaign at the present time in Western Canada, having sent a factory representative to Winnipeg, Regina, and Edmonton. Mr. Stark, general manager of the company recently made a trip through the West appointing agents in the principal towns. Mr. Fred E. Garrett who is representing this firm in the prairie provinces, reports business as being very good. The Sibbald Electric Co. Ltd., Winnipeg have been showing some very attractive window displays of this line.

Dinner in Honor of A. W. McLimont

On Wednesday the 11th October, the heads of departments in the Winnipeg Electric Railway Co., and the Manitoba Power Co., gave a dinner at the Royal Alexandra Hotel, Winnipeg, in honor of Mr. A. W. McLimont, vice-president and general manager of the two above named companies, the occasion being the celebrating of Mr. McLimont's fifth anniversary with the Winnipeg Electric Railway Co. Sixty five covers were laid for the dinner. Mr. John Whitsell, manager of the Winnipeg Electric Railway Co., acted as chairman. An elaborate programme had been prepared by Mr. H. C. Howard, publicity manager of the Winnipeg Electric Railway Co., and great credit is due him for his good work. It is unnecessary to say much about Mr. McLimont as every westerner in the electrical industry knows what has been accomplished by him during the past five years, how he has won the sympathy of the public, the goodwill of his employees, and the great strides that have been made under his direction in both the Winnipeg Electric Railway Co., and the Manitoba Power Co.

A. W. McLimont

The menu card was a very handsome, artistic production, the border illustrations weaving in the various activities of these two great companies. A fine photograph of the McLimont showing, in the background the big head office building adorns one of the pages.

H. W. Monahan Visits Winnipeg

H. W. Monahan, manager of the Electric Sales and Engineering Co., Fort William, Ont., was a recent visitor to Winnipeg, where he spent a few days on business matters. This company has just completed the street railway extension to Chippewa Park, on the north shore of Lake Superior, the trackage being 1 mile and a third long. Fares were collected just five weeks after the work was commenced. This is very rapid work, considering that the comstruction work was done under difficulties owing to the fact that a considerable portion of the laying of the track was through muskeg. A great deal of favorable comment has been heard ond Mr. Monahan, who supervised the work, is to be congratulated.

Harry Reid Changes Territory

Harry Reid, who is well-known to the electrical industry in Winnipeg, having been connected with the Great West Electric Co. for a number of years, it going to cover Western Ontario, Manitoba and Eastern Saskatchewan for the same firm.

City of Brandon Wants Hydro Power

Plans for the immediate gathering of further data in connection with power matters were discussed at a joint meeting of the city council, and the power committee of the Board of Trade, held in the City Hall, Brandon, on Friday evening Sept 22. As a result of the discussion on the subject of power negotiations, it was decided to invite Mr. J. G. Glassco, general manager of the Winnipeg Hydro-electric System, to visit Brandon within the next few weeks and to address another meeting of the City Council and the Board of Trade.

It was also recommended that invitations be extended at once to the Manitoba Power Company, and the Manitoba Power Commission to submit some plans or open negotiations with a view to obtaining cheaper power for the City of Brandon. If personal representations will be made by any of these parties, the City Council and Board of Trade will hold special meetings, and take up the matter with them.

Judging from the discussion the big question now is, whether it is to be hydro or steam power, though hydro appears to receive first consideration. It is stated that good inducements will be offered in the way of a franchise to the company offering the right kind of proposition that can be carried out. Mr. J. Rochetti, acting Power Commissioner for the Province of Manitoba will visit Brandon at the end of October and submit a proposition to the Council, and Board of Trade.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Steam Plant for Hanna, Alta.

The Municipality of Hanna, Alta., have recently placed a contract with the Canadian General Electric Company, Ltd., for the supply of one 125 kv.a., 514 r.p.m., 2,300 volt, three phase, 60 cycle generator with direct connected exciter; the same company will supply Goldie McCulloch high speed, vertical, forced lubrication engine and two Canadian Allis Chalmers boilers 72 by 18, 150 h.p. return tubular type, together with two steel smoke stacks 36 inch diameter, and 60 feet high. Further equipment by the same company includes a panel for the generator, a constant current street lighting transformer with control and a number of lightning arresters; also feed water boilers and deep well steam pumping equipment. This machinery will be installed by the Canadian General Electric Co., Ltd., who are co-operating with Haddin and Miles Ltd., consulting engineers, Calgary, Alta. In connection with the same piece of work, contract for the pole line construction has been let to E. Kelly; poles to Electrical Engineers Ltd.; building of power house to J. E. McFarlen, and drilling wells to P. O. Drynes. The total contract for plant and transmission will be approximately $35,000.

Winnipeg Hydro Issues Souvenir

The Winnipeg Hydro-electric System has just issued a well illustrated souvenir book, showing the magnitude of its operations, and fully describing the different departments of the system. Mr. W. T. King, publicity manager of the Winnipeg Hydro-electric System, has compiled the data. A copy of this souvenir will be mailed free of charge to anyone interested by applying to the Publicity Department, Winnipeg Hydro-electric System, 55 Princess Street, Winnipeg.

Persons Carried by B.C.E.R.Co.

In a bulletin issued by the B.C.E.R. Co., it is stated that there are about 130,000 persons carried per day in Vancouver city, with 50 per cent more on holidays, or other big days.

Advertising and the Electrical Industry

The Manitoba Electrical Association Learn Publicity Methods and Values

In the words of Jack Miner "I know as little about electricity as I do of the price of pork grease in Jerusalem" said Mr. Pratt Kuhn, western manager of the A. McKim Advertising Agency, before the Manitoba Electrical Association, at it's fortnightly luncheon held at the Fort Garry Hotel, Winnipeg, on Thursday the 19th of October, but I do know as a layman what electricity does for me and from that end of my chart today, you perhaps may secure helpful suggestions. I find that you expected me to talk on "The Advantages to the Electrical Industry of Commercial Advertising" and I am instantly struck with the similitude of advertising and electricity.

You can't see electricity as it flows through a wire you only know that if you have produced it properly and made the right connections, it will deliver power at the far end of a wire. So with advertising properly handled; it cannot be seen at work, but it delivers sales at the retail end of its journey. Speaking of power and advertising, I am again reminded of the steam engine as it pulls the train; it costs a lot of effort to get started, but very little in proportion to keep going. So is it with advertising; the culminative results constantly lower the proportionate cost of advertising.

How does electrical advertising actually effect a layman—myself? On the way here I mentally reviewed the electrical apparatus in my house and found I could definitely trace most of it to advertising. Here is my equipment, so far: electric range; cosy stove; reversing toaster; electric irons; vacuum cleaner; coffee percolator; curling tongs; one kilowatt water heater; mazda opal globes. Now it may have cost advertising a lot of effort to get me started, but I am still buying and have become an "Electric Fan," on the lookout for something new.

That reminds me of the fact that there are between 6,000 and 7,000 electric ranges in homes of this city. This means they enjoy cheap power; it also means a market readily available for every electrictal attachment, because once the first wiring is over, once they are inoculated with the electric germs of comfort and cleanliness, they are easy victims for advertised electrical goods. Your work in Winnipeg of conducting a weekly section of electrical news in the daily papers is excellent and I must congratulate the committee who handle it so well, viz: Messrs Deering, Howard and King. I have secured many hints from it for household use. It is rather a thankless task, though, that of preparing a weekly section and I urge all members to cooperate to the fullest extent with the committee.

You asked me to speak on advertising, but I find I am speaking on the results of advertising as shown in sales, because that is what counts. It would be fallacy for me to attempt to crowd into twenty minutes the experience of twenty years, nor to do else than "High Light" my subject.

Handling, as my firm does, nearly 400 accounts, we are daily and hourly in touch with the Canadian markets as reflected in buying impulses of the people. There is a reason, a time, and a way to advertise everything, but there is no easier way to lose money than by poor advertising, so it pays to study this phase of your business just as carefully as you do your buying end, because advertising is a sales force and should reduce overhead instead of adding to it. Again as a layman I point out to you, that advertising coupled with the wonderfully cheap electric current of Winnipeg, induced me just as soon as I bought my house to install an electric range. From there on I was a legitimate prey; yet I point out to you that I have no electric grate; electric dish washer; electric washing wachine and many other items, though some day, advertising will get me on these (if I don't watch out).

May I suggest that the Electrical Industry of this city concentrate on having everything electrical around this city right; see that all store signs have globes intact, that all windows are properly illuminated, that street festoons of lights are all lighted, and no blanks, and so impress yourself on the community by the result of your good works, that they in turn will have good will towards electricity, become charged with energy and so make the result of your commercial advertising measured, in terms of sales, a real success.

Mr. C. F. Gray, who has recently returned to Winnipeg from England

Calgary Members Are Up and Doing

The Calgary Association of Electrical Contractors and Dealers, is a real live organization. This association holds its meeting every second Thursday, immediately after partaking of a light dinner. The meetings are very snappy and are over by 8:30 P.M. Following are the officers: G. M. Wilkinson (Cunningham Elec. Co. Ltd.) chairman; E. Beard (Budden, Beard & Co. Ltd.) secretary; Guy Morton (Electrical Engineers Ltd.) treasurer.

Robert MacKay, superintendent of the Electric Light & Power Department of the city of Calgary, with the assistance of the local jobbers, dealers and contractors, has been campaigning successfully on the electric range for cooking and the electric water heater for domestic use. Much credit is due Mr. MacKay for his untiring efforts.

The Cunningham Electric Company, Ltd., have recently started a sales campaign on their fourth carload of washing machines.

Guy Morton, manager of Electrical Engineers Ltd., has been successful in securing the order for the installation of a power plant to light the town of Carbon, Alberta. This plant will also supply the local mines with power.

Over 22,000 People Visited Montreal's Latest Electric Home in One Month

"We Were Not Bored Nor Made to Listen"

The Electrical Co-operative Association, Province of Quebec has just closed the doors of its most successful Electrical Home, which was held in the Notre Dame de Grace District. The total attendance from September 16th. to October the 17th. was 22,738 adults, besides a very large number of children. This seems to be the largest possible number, according to a statement by Mr. Louis Kon, the association's secretary-manager, that can be properly and satisfactorily handled from both the visitors' and the industry's point of view.

In Montreal Mr. Kon states that from the very outset of the campaign there was no desire to report spectacular numbers of visitors or to have long rows of people anxiously waiting outside to be admitted to inspect the Home, their object was to give comfort to everyone visiting the Home while seeing everything the association wanter them to see and hearing everything they wished to tell them, to give everyone an opportunity to ask any questions they may wish to ask and to make them feel as if in a Home and not in a public exhibition place. This is impossible of accomplishment if the visitors have to be pushed from one room to another and to stand three or four deep while listening to a spiel prepared for the occasion.

The Montreal Association believes this to be the wisest method to adopt, as even persons who ostensibly came to see the rugs and curtains, or to find out how a certain color of wall paper blends with some other color of hangings or up holstery, on many occasions admitted to becoming interested, and very much so, in the explanations why a home should be properly wired and what the various appliances can do for a woman householder. As one visitor expressed it.

We were not bored nor made to listen but we were free to go about as we pleased." It was not a drive for boastful figures, but for maximum results.

The official opening of the Home was performed by Alderman Seybold, representing the Notre Dame de Grace district on the city council, who expressed the Mayor's regret at his inability to be present personally, Mrs Sproule, president of the Notre Dame de Grace Women's Club, Mr. K. B. Thornton, president of the Co-operative Association and Mr. M. K. Pike, chairman of the Executive Committee as well as a large number of prominent men and women of the city, assisted at the function.

Mr. Thornton, in welcoming the official representative of the city and Mrs. Sproule, outlined the aims of the Association, its composition and the reasons why "Electrical Homes" are being organized by Associations like the Electrical Co-operative. He expressed his great pleasure at the attitude of the Citizens of Montreal towards this educational campaign to demonstrate to them the ramifications of electrical energy in simplifying, shortening and making economical the many, tedious tasks of home work.

Alderman H. B. Seybold thanked the association and its secretary-manager for selecting the Notre Dame de Grace district for this educational campaign and he felt that not only the purpose but also the manner in which the undertaking is being carried out and constructed reflect a great deal of consideration for making Montreal a city of truly modern homes besides popularizing the greatest boon of mankind—electric light, heat and power.

Mrs. Sproule, on behalf of the women of Montreal assured their heartiest support in the endeavors of the association to make every newly constructed house in their district a Modern Electrical Home. She referred to the tasteful, well planned and artistic was the Home was furnished, decorated and equipped. There was no more any doubt in her mind that the association was sincere in its statement "we wish just to educate the public as to the advantages of wider use of electricity and electrical labor saving devices."

Less fatigue, less cost and less time in managing a home is what the women of the present generation must have to fulful the additional obligations they have undertaken as citizens of the state and community. It is by means of educational exhibits like the Modern Electrical Home that the women will learn where the old methods end and the new begin.

She saw just one danger in the electrical Home and that was that the women studying it may demand instead of asking from their husbands the many useful things to be seen.

Even the most uninterested persons had admitted that it was a really charmingly decorated, furnished, illuminated and electrically equipped home; there was not a note of discord in the whole arrangement, everything was in keeping with the size, value and location of the house, it was neither over nor under done.

Visitors Enjoyed Themselves

The atmosphere of the Home and attitude of the hosts showing the visitors around and the constantly heard "thank you very much, we certainly did enjoy your hospitality and the arrangement of the home, and we shall tell our friends to visit it," made, indeed, an impression of a Home and not of an exhibition.

In the adjoining house there was installed one of the latest Radio receiving sets where popular but interesting explanations of what a Radio set is, how it works, what the functions of the various parts are, how broadcasting is done and what can be expected from a radio set now and what it is hoped it will do, were given by experts; from 8 to 10 concerts were given for the ever eager to listed crown of visitors. The radio set was not installed as a novelty and curiosity or as an additional talking point about the Home; its purpose was to develop an intelligent interest in this wonderful instrument.

Now for the Main Question?

Will this Electrical Home fulfil the expectations of the association as to its actual effect on better wiring of residences?

It most decidedly has done much already. The Lancashire Land and Construction Company, whose house was used for that exhibit have already wired a number of their houses according to the plan prepared by the association's Wiring Committee, which was the plan of wiring the Electrical Home; the committee consisted of an architect, an electrical consulting engineer, a specialist on illumination, and two electrical contractors.

It was not an Exhibition Plan, but a plan of installation reasonable in expenditure and satisfactory from the point of view of illumination and provision of switches and convenience outlets, with a service calculated on the basis of maximum possibilities in a house medium in size and in price—what is known as an average house.

There was no desire to show what **could** be done, but an attempt to make builders of homes see what **should** be done in a matter of proper electrical installation.

It may be safely stated that in Montreal a standard of proper wiring installations for medium sized dwellings has been introduced to stay.

The above mentioned company have issued a very handsome illustrated album-folder describing their houses for sale, the illustrations being the photographs of this "Modern Home." They make, in that folder the following statements: "All our houses are wired according to the plan approved and adopted by the Electrical Co-operative Association, Province of Quebec, which was the plan of the Modern Electrical Home." In calling attention to the various features of their houses, they have the following special paragraph "Electrical wiring; plentiful and properly placed convenience outlets (plugs) in all the rooms assure all the convenience and more comfort electricity offers in a fully modern home as it is understood today."

This and demonstrating to 33,290 persons who visited the two Electrical Homes during this year the desirability and advantages of properly wired homes are creating demand for such houses on the part of purchasers and tennants; speculative builders, for purely competitive reasons will have tofollow suit.

The principals of the Lancashire Land and Construction Company frankly admit that although the cost of their present electrical installation has increased from $60.00 to $225.00 per house it helps them to dispose of their houses with less effort, and besides they also admit that lately the purchasers began to be considerably more particular in the matter of demanding reasonable provision of light, switch and convenience outlets in houses offered for sale.

They have started on a building programme of some 95 houses, all of which will be properly wired for electricity.

The advertising and window displays' campaign while the Home was open to the public was based on the popularization of the "Duplex Convenience Outlet." The newspaper ads illustrated the convenience outlet, likewise the cut-outs in the window displays. around which were built-in real duplex convenience outlets to which were attached many small and large appliances displayed in front of the cut-out.

Other cut-outs had enlarged plans of the house with the lay out of wiring and all the electrical symbols.

The wings of the cut-outs in both cases had a reference to the Association, the Home and an invitation to visit it.

This Home had not only helped to get the co-operation of women in the campaign for better wired homes, but also clubs like the Kiwanis realizing that it is not a selling but an educational campaign and that the co-operative association is not a commercial enterprise, have given their support to the movement. The weekly letter of October the 2nd. mailed to all the members by C. Russell the secretary of the Montreal Kiwanis Club had the following announcement: "Make a note on your calandar and be sure to visit the Electrical Home, 323 Wilson Avenue, N.D.G. Thursday Night, October the 5th, and take your wife (or prospect) with you. The very latest development in illumination and electrical appliances will be shown and you will be well repaid for the visit. Kiwanians will be on hand to greet you and show you through this Modern Home."

On that particular night Mr. C. M. Tait, chief electrical inspector Canadian Fire Underwriters Association was in charge of the Home with the following Kiwanians connected with electrical industry to assist him in taking the guests through the Home: J. A. Anderson, J. A. Anderson & Co.; H. F. Adams, Acme Vacuum Cleaner Co.; W. H. Barry, Lincoln Electric Co.; P. H. Ferguson, McDonald & Willson L. A. Johnson, Northern Electric Co.; E. W. Sayer, Sayer Electric Co.; C. Thomson, Fred Thomson & Co.

One of the most gratifying signs of the interest visitors were taking in this Home was the fact that some of the women kept coming repeatedly with a new group of their friends to show to them what is to be had to make a house a home by the aid of electricity; women who after one visit to the Home come again accompanied by their husbands, and a large number of people kept volunteering not only their praise but their testimony that they were in the previous Electrical Home held last March, from which they gained many suggestions for improved illumination, placing of additional convenience outlets and use of appliances.

A very satisfactory number of return cards, attached to the pamphlets, which were distributed to all visitors, were received by the Association with requests for pamphlets on Wiring the Home for Convenience and Comfort" also for the "Suggested Plan of Properly Wiring Medium Sized Houses"; besides, a number of persons intending to build or actually building called in person at the Association's office for such plans.

It was found from previous experience that it is very undesirable to prepare the talk which is to be given to the visitors.

To make it sure that nothing will be omitted in explaining the points the Association was anxious the public to know, some instructions and suggestions were outlined by the secretary manager, which were read by those on duty, and developed into short talks by every host or hostess according to his own wish for expressing it. which has proved to be a good method to follow.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

British Brass Fittings, Ltd.

George Sperryn, chairman of the British Brass Fittings Ltd., which comprises the following British firms—Sperryn & Co., Birmingham; Chas. Joyner & Co., Birmingham; Player & Mitchell, Birmingham; and Ingram & Kemp, Birmingham—was a recent visitor to Winnipeg, spending about a week in that city, studying the Canadian market. Mr. Sperryn has been visiting New Zealand and Australia, and is now on his way back to England. He was amazed at the advancement of the electrical industry in this country, and considers Canada far ahead of England as far as electrical activity is concerned.

Cora-Lites Catalogue

Dealers preparing for the busy fall and winter campaign will find the new Cora-Lites catalogue a source of fruitful hints and suggestions. The Cora-Lites catalogue is intended for anyone interested in better commercial lighting. The complete history of Cora efficiency, with descriptions and illustrations of the many different designs, is among its contents. A striking feature of its mode of arrangement is that it is in loose leaf form, thus enabling dealers to remove a page showing a single unit and permitting the customer a more definite idea as to what design he desires. Dealers may secure a copy of the catalogue by addressing the Consolidated Lamp & Glass Company, Coraopolis, Pa., or R. E. Davis. 113 Wortley Road, London, Ont.

The Century Electric Company announces that Mr. E. L. Kennedy, formerly connected with their Cleveland, Ohio, office has been appointed district sales manager at their Rochester New York office, 632 Granite Building.

Aggressive Programme Outlined by Electrical Co-operative Association, Province of Quebec

M. K. Pike, General Sales Manager of Northern Electric Company, Elected President

On October 18th, the Electrical Co-operative Association Province of Quebec held the second annual meeting. Mr. K. B. Thornton, president of the association presided; the attendance was nearly a hundred. In reviewing the past years' work both the president and the secretary manager, Mr. Louis Kon, emphasized the splendid actual results accomplished from the two "Electrical Home" exhibits held during the past year which had done so much towards establishing in the city of Montreal and vicinity a standard of proper wiring installations in dwellings. The activities and accomplishments of the Association during the past year were many and varied, and it is safe to say that the movement of co-operation in the Province of Quebec has proven itself sufficiently useful to ensure its permanency. The office of the Co-operative Association has become during the past year the centre and headquarters of almost all the organized activities of the electrical industry.

Mr. Thornton emphasized the necessity of a wholehearted support both financially and actively of such an organization as the Co-operative Association; as a proof of confidence in future results from the work of the association and an expression of satisfaction with what was already accomplished, he announced that the power companies, members of the association, and the larger manufacturers and jobbers contributors have decided to increase their contributions for the ensuing year by 25%, a lead which it is expected will be followed by all other contributors.

He also emphasized the absolute necessity of it being everybody's organization and conducted for everybody's benefit; once an attempt to serve a particular group of the industry or any particular concern were to creep into the association's work it would inevitably and deservedly collapse through loss of confidence of the public and of the members. The field of usefullness of the association is very large and he did not fear that with desire to develop it and with financial and moral assistance it will meet the expectations of those who first sponsored and initiated this movement in the Province of Quebec.

Mr. Thornton expressed his regret at the necessity of his withdrawal from active participation in the work of the association due to ever increasing business and professional responsibilities as the general manager of the Montreal Public Service Corporation and chief consulting engineer of the Montreal Tramways Company; he assured his hearers, however, of his continued interest in and support of the association's work whenever an occasion may present itself. Mr. Thornton highly commended the zeal, industry and initiative of the secretary-manager who presented a very satisfactory report. The nominating committee recommended a slate of officers, executive and an advisory council which were unanimously accepted:

Officers and Executive

Honorary President: K. B. Thornton general manager Montreal Public Service Corporation. President: M. K. Pike, general sales manager Northern Electric Company, Ltd.

Vice-presidents: J. B. Woodyatt, general manager Southern Canada Power Co. Ltd.; W. O'Brien, manager New Business Department Montreal Light, Heat & Power Consolidated; J. W. Pilcher, district manager Canadian General Electric Co.; R. J Beaumont, gen. mgr., Subsidiary Distribution Cos., Shawinigan Water & Power Company, Ltd.; F. J. Parsons, managing director, McDonald & Willson, Ltd., N. Simoneau, electrical contractor, Simoneau Electric Contracting Co.

Honorary Secretary-Treasurer: L. C. Haskell, secretary-treasurer, Southern Canada Power Co.

Secretary-Manager: Louis Kon.

The unanimous election of Mr. M. K. Pike as president and chairman of the Executive Committee assures continued success of the Association and accomplishment of the following ambitious plan for the year's work. (See next page.)

Mr. Pike will have full measure of generous support of the executive and advisory council during the present year.

Mr. Pike is an ardent supporter of the co-operative movement; his understanding of co-operation is not just talking about it, but actual work for that cause, sincere belief in it and practice wherever there is an opportunity to co-operate for a common good.

Besides being elected to the presidency of the Co-operative Association, Mr. Pike is also president of the Canadian Supply Jobbers Association and a member of the executive committee of the Canadian Electrical Association.

M. K. Pike

Among the items mentioned in the report were a number of activities of the association such as the success of the Electrical Home campaigns; the preparation of house wiring plans for distribution among architects, electrical contractors and, on occasion, to the public; the preparation of a set of standard electrical symbols for the use of architects and electrical contractors. Mention was also made of the introduction and preliminary operations of the provincial Licencing and Inspection Act; to date eighty contractors and four hundred journeymen in Montreal have obtained licences. Other activities included the issuing of bulletins, providing speakers for the co-operative luncheons and a permanent exhibit of wiring devices installed in the association office at 65 McGill College Avenue, for the purpose of showing architects what the market has to offer.

Programme 1922-1923

Modern Electrical Homes of two weeks duration in Outremont and East End or Outremont and St. Lambert; also in Quebec City and Sherbrooke.

A modern Electrical Home of three months duration open to the women three times a week from 2 to 5 p.m. where actual demonstration of the use of domestic labor-saving appliances would be given by experts. This to be worked in co-operation with various women's organiza tions.

Electrically equipped car in conjunction with Better Farming Train.

Industrial Lighting Exhibit for about two weeks.

Organizing of High School Students' and School Teachers' visits to power plants.

Drive for better store illumination.

Co-operative advertising.

Further distribution of wiring plans and standard symbols.

Joint luncheons with architects and development of closer co-operation with them.

Co-operation with the Government in proper enforcement of the Licensing and Inspection Act throughout the Province.

Permanent electrical corner once a week in the local press.

Continuation and broadening of activities of Trade Relations Committee.

Occassional social gatherings, theatre parties, etc.

Developing the Contractor-Dealers Association (one of the most important functions of the Association).

Organizing of Appliance and Fixture Sections.

Three or four Mass Meetings on proper methods of merchandizing electrical goods, with lectures on salesmanship by outside speakers.

Drawing of departmental stores handling electrical work and goods into the work of the Association.

Issuing of a monthly bulletin.

Better window-dressing.

Education of public on the value of electricity through moving picture films.

What Is the Cost of Appliance Selling?

(Continued from page 65)

man, and not because they are making any money upon them."

"When many of the other companies in more or less of a panic reduced their prices on these appliances this company increased its price, as it had found that it was obliged to do so in order to sell a dependable product and get out whole. Many of our people, especially the salesmen, felt that the increases in price would cut down the sales very decidedly, but the reverse has been true, owing to the increased advertising and the increased salesmen's commissions which were possible. The company nets more money per appliance, and sales are practically double what they were eight or ten months ago under the former policy."

"There were so many people in our company who believed that we were selling at too low a profit, I called in the services of an unbiased expert accountant. The results of his investigations are given in the accompanying table, for June and July of this year, in percentages. While some of the costs may be open to question, and while a lot of you may think that you can do business a great deal better than the company in question, they are the actual costs. To the very great surprise of everyone, they showed that even on these higher prices the machines were being sold at a loss instead of a profit. You can well imagine that this was a very great shock. This is typical of the entire merchandising situation, and it is time for every one in the business to give careful attention to these features."

Prominent Electrical Contractor-Dealers

— I —

Harry Hicks, President Ontario Association Electrical Contractors and Dealers

The business success of Mr. Harry Hicks furnishes an excellent illustration of the fact that fair dealing and hard work are a winning combination, even if the aspirant for success has to start with very limited capital. Harry was born in 1877 at Humber Bay, Toronto, son of O. L. Hicks, prominent builder and contractor of York County. He attended the schools of Toronto, and gained his first business experience in the plumbing trade, at which he worked for 7 years. Opportunity then beckoned him and he embarked on a double venture—that of matrimony and of beginning business for himself. It was hard plugging for awhile, but he soon got things running smoothly, and his office at 137 Church Street was a busy place. After a time, he purchased the business of the late T. L. Hicks (one of the electrical pioneers of Toronto) and moved to his present stand, 203 Church Street. Here the business has grown until at the present time, Harry Hicks is one of the best known electrical and plumbing contractors in Toronto. One of the reasons for his success lies in the fact that he has always taken a keen interest in association matters, and has worked continually to improve the status of electrical contracting. A member of various organizations, he has held several offices, his latest appointment being that to the position of Chairman of the Ontario Association of Electrical Contractors and Dealers. Mr. Hicks is a firm believer in co-operation, and his consistent adherence to that principle, as regards both his business associates and employees, is one reason for the high esteem in which he is held in electrical circles.

The President, Harry Hicks

What Is the Actual Cost of Appliance Selling? Time We Quit Fooling Ourselves

Average Expense per Unit of Sales Greater Than Ordinarily Expected—The Fallacy of Price Cutting — Necessity of Independent, Prosperous Dealers — Analysis of Cost of Selling by Expert Accountants.

The statements contained in this article are made by a man of mature experience on merchandising matters. He urges appliance men to learn their costs and to cease selling goods that do not yield them a profit. His championship of the small dealer is based on sound reasoning—a real market for appliances can only be created by the establishment of a large class of resourceful and independent dealers. His statement "too many men do not know their costs," seems to be true beyond all question.

It is a fact that people do not come in and buy electrical goods on their own initiative. More than ordinary advertising is necessary, in addition to that we must have salesmen who will go out among the people and demonstrate to them in their homes the advantages of becoming users of these appliances. This means more than the average amount of expense per unit of sales for advertising and selling which the ordinary retail merchant is expected to assume. In addition to these expenses is has been found that, like furniture, pianos and certain other household equipment, electrical merchandise must to a large extent be sold on deferred payments if a reasonable volume of business is to be expected, which introduces more cost for the carrying of accounts.

"We are altogether too prone to optismism in convincing ourselves on the most superficial information that we are making profits and that we are a little more clever than other people and can sell lower and still make money. It is time that we quit fooling ourselves.

"There seems to be a very general feeling among merchandisers—and the less experienced they are the more they are subject to such convictions—that in order to get volume of sales, prices must be made very low, and that prices can move in one direction—downward. Any effort to move them in the other direction, it is supposed, will dry up the business. This is a fallacy, particularly with articles of as much real merit and real demand as electrical appliances.

"The central stations are no doubt more responsible than the manufacturers for the fact that there is not a proper expense and profit "Spread" in the selling of appliances. When appliances first came on the market the central stations universally had very little idea of attempting to make a merchandizing profit, their whole thought being that they could afford to sell this apparatus at low prices, and even take merchandising losses,in order to rapidly place a large amount of it on their circuits, and derive the income from the sale of electricity which would result. This policy on the part of the central stations has misled the manufacturers, and the study of costs and the question of what "spreads" are essential to the retailer have been rather ignored. Appliances are sometimes put out on such a basis by central stations, that the independent dealer, even if he is fortunate enough to be able to purchase at as low a price, cannot possibly compete and live.

"The greatest importance should be placed upon the necessity of a policy which will develop prosperous dealers. The central-station companies should be leaders in this matter of selling and distributing merchandise, but even if it were good policy to attempt to monopolize the business—and it is not good policy—they cannot begin to cover the field. Their best interests lie in developing a large number of prosperous, well run, independent businesses, which will become broad distributors of the electricity-using devices that are becoming each year a more and more important factor in the income account of the central stations."

"I want to quote a letter written about a year ago by a very able and intelligent dealer in a western city, who has had a great deal of experience; 'The average dealer's discount, as you are no doubt aware, varies from 25 to 35 and 5 per cent. The average dealer's overhead is determined from stores in operation, is 28 per cent. Every family uses a cookstove, either gas or coal, and the discount to the dealer on cookstoves is from 40 to 60 per cent, varying with the make and quality of the product. Cookstoves sell themselves. Washing machines have to be sold and require not only an extensive sales force but expensive advertising as well. If the margin on washing machines was 50 per cent, every electrical dealer and contractor could be an outlet for the washing machines, but dealers today are only selling washing machines because they have listened to some persuasive argument of a good sales-

Table I—Statement of Average Unit Cost of Selling a Washing Machine for the Months of June and July, 1922

	June per cent		July per cent	
Average net selling price	100.0		100.0	
Average cost per machine sold	56.6		58.0	
Gross profit per machine		43.4		42.0
Average expense per machine sold:				
Selling:				
Commissions	17.8		18.7	
Bonus	0.8		0.8	
Premiums	1.8		2.7	
Demonstrating	1.4		1.7	
Salaries, adjustments and sundries	1.6		2.2	
Delivery and salesmen's automobiles	4.0		5.7	
Repairs	1.1		1.6	
Total selling	28.5		33.4	
Buying	2.1		2.5	
Occupancy	3.6		4.2	
Publicity	4.9		4.6	
Administrative	8.5		12.2	
Overhead expenses	19.1		23.5	
Total expenses		47.6		56.9
Average loss per machine		4.2		14.9

(Concluded on page 64)

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*Abstracted from a paper presented at the convention of the Great Lakes Geographic Division of the National Electric Light Association at French Lick Springs, Ind., by John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, Ill.

Border Cities Pure Food and Electric Show

The third annual Pure Food and Electric Show held under the auspices of the Border Cities Retail Merchants' Association in the Windsor Armouries from October 16th to 21st, proved to be the most successful in the history of this event.

The feature of the show was an exhibit by the local electrical-dealers in conjunction with the Windsor and Walkerville hydro-electric systems.

The number of sales of electrical merchandise made during the show was very gratifying. A great many prospects were also secured. The interest shown by the people who thronged the Armouries during the entire week augurs well for the future of the electrical industry in this locality.

At a banquet tendered the exhibitors at the Prince Edward Hotel on Friday evening, the management of the show expressed the opinion that in a short time the Electrical section would exclude the Pure Food section on account of the increase in the demand for space by the manufacturers of electrical appliances. This year approximately two thirds of the space was occupied by electrical exhibits. Thirty-five different manufacturers of electrical appliances having their merchandise on display in sixty-five booths out of a total of ninety-one. Practically every type of electric washer was shown, there being fourteen different makes. Electric ranges were next with five, while vacuum cleaners were well represented with four. The electric ironing machines attracted a great deal of attention as did the electric sewing machines. An unusual amount of interest was also displayed in the booths where fireplaces were shown; evidently the people are thinking of taking precautions in case of a coal shortage. The manufacturers and dealers expressed themselves as being well satisfied with the results obtained from the show and hope to soon fulfil the predictions of the management and make the show altogether electrical.

Signal Electric Acquires Hulbert Patents

The Signal Electric Manufacturing Company of Menominee, Michigan, has acquired the Hulbert patents and taken over the assets and liabilities of the Hulbert Electric Manufacturing Company of Chicago, Illinois. Under this arrangement production of the Hulbert battery charger will be increased and others of the Hulbert patents will be developed and put into production. Mr. C. H. Hulbert will hereafter be identified with the signal electric manufacturing company, in the capacity of research and development engineer.

F. M. Webber Joins Robbins & Myers

Mr. F. M. Webber, who for the past three years has conducted an electrical appliance business in Philadelphia, has joined the Robbins & Myers company as assistant sales manager in charge of motor sales, filling the place recently vacated by Mr. A. J. Reed, who has resigned. Mr. Webber was for sixteen years connected with the General Electric Company, entering the employ of the Ft. Wayne Works in 1903. From 1913 to 1919 he was apparatus sales manager of the St. Louis office of the General Electric Company.

A Gigantic Electric Sign

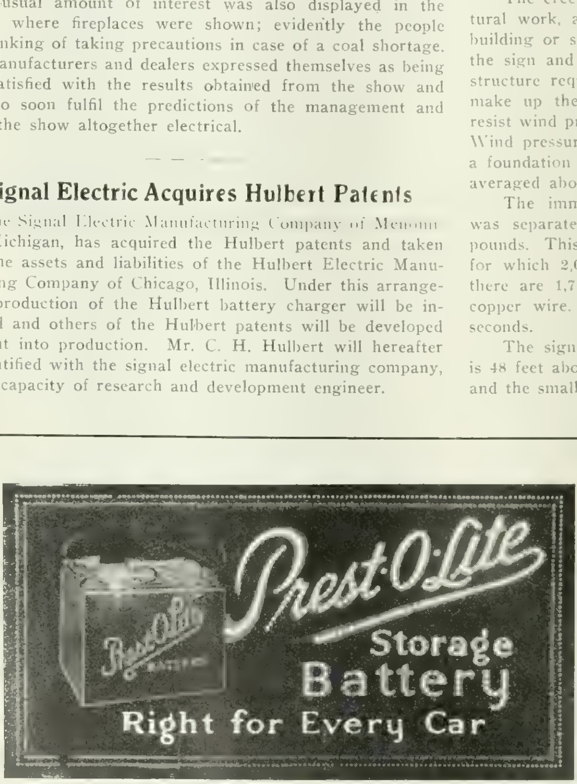
One of the largest electric signs in the country has recently been erected in Toronto by the Prest-O-Lite Company of Canada. Its appearance is most imposing and is hardly done justice to by the accompanying photograph, which of course cannot convey the striking display of color that is the distinguishing feature of the sign.

The action is as follows: First the terminals of the cables on the battery glow with a dull-red, short-circuiting the battery, then the sparks fly out like fire. After the sparks have died away the words on the sign flash into view until every one is illuminated, then all the lights go out. The border of the sign is of red and green lights which travel with a continuous movement from left to right and from right to left. The cycle of operations is carried out every twenty seconds.

The erection of the sign involved a good deal of structural work, and it had to be as carefully designed as any building or small bridge. When the plans were drawn for the sign and framework it was found that this part of the structure required 14 tons of steel. This was necessary to make up the design, carry the lighting apparatus, and to resist wind pressure and the dead and snow loads figured on. Wind pressure was a considerable item. To carry the load, a foundation embodying 32 concrete piers was used. These averaged about 1½ tons of concrete each.

The immense reproduction of a Prest-O-Lite battery was separately constructed, and weighs upwards of 1,200 pounds. This part of the sign is illuminated by flood lighting, for which 2,000 candle power is used. In the whole sign there are 1,750 electric light bulbs used, and 9,000 feet of copper wire. The machinery makes 22 contacts every 20 seconds.

The sign is 60 feet long and 30 feet high and the top is 48 feet above the ground. The letter "P" is 15 feet high, and the smallest letter 2½ feet high.

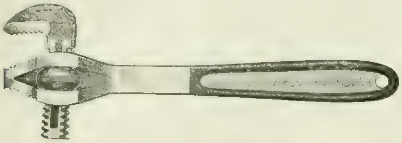


Unfortunately, the camera does not catch the brilliant display of color which floods this sign. This photograph was taken at night and gives some idea of the striking nature of the design.

The Latest Developments in Electrical Equipment

"Little Giant" Pipe Wrench

An "end-opening" pipe wrench for threading conduit has been placed on the market by the Greenfield Tap and Die Corporation, Greenfield, Mass. It is made in three parts, a handle and jaw in one piece, a movable jaw and steel nut. The manufacturer states that the wrench can withstand stresses in excess of 4,700 in lb. A double set of teeth is provided on the main jaw. The wrench is manufactured in 8, 10, 14, 18 and 24-in. sizes.

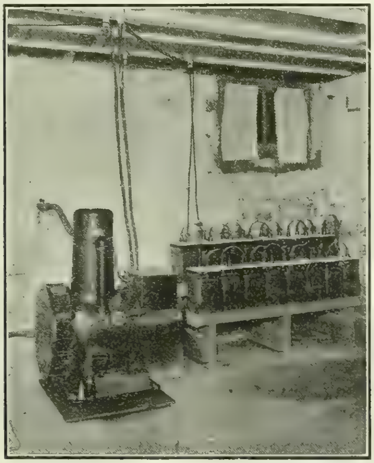


Electric Light and Power Plant for Farms

An electric light and power plant for use where central station service is not available has been developed and recently placed on the market by the Westinghouse company.

The plant, a feature of which is its simplicity of operation, no mechanical skill or knowledge being required for that purpose, has been designed practically for furnishing both light and power for all the requirements of farms, camps, boats, suburban houses, churches, and missions.

The plant, which consists of a storage battery and a generator directly connected to, and driven by, a single cylinder engine, occupies little floor space, requiring only about 2 x 1-½ feet. The engine can be run on kerosene, gasoline, or natural gas. The generator has a capacity of 750 watts and is bolted directly to the engine frame. The plant operates at a slow speed. The batteries are of molded glass and ordinarily need to be charged only every four or five days. The electric control apparatus is entirely enclosed in a box mounted on the generator frame. When the starting lever is pressed, the generator cranks the engine from the battery and, when the battery is fully charged, the engine stops itself. The length of time required to charge the battery is determined by taking a hydrometer reading directly from the liquid in the battery. This time is then set on a meter which automatically stops the engine when the correct time has been reached. A table for correcting the hydrometer reading for temperature is provided. The plant will furnish electricity for twenty two 25 watt lamps for eight hours from the battery alone or 52 lamps for eight hours from the battery and the generator combined.



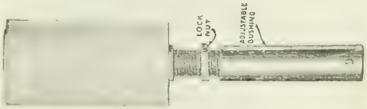
A larger plant that has a capacity of twenty-nine 25-watt lamps for eight hours from the battery alone or 89 lamps for eight hours from the battery and generator combined is also being made. This larger plant also has a belt pulley for furnishing mechanical power directly from the engine and is especially adapted for use where considerable apparatus is to be used. The operation and description of this larger plant are practically the same as of the smaller one. Both are completely made, with the exception of the batteries, in the Westinghouse works.

I-D-A Concealed Socket

The accompanying illustration shows the I-D-A concealed socket as manufactured by J. E. Watson Mfg. Co., 412 West Wellens Avenue, Olney, Phila., Pa. It is claimed by the manufacturers that the I-D-A Concealed Socket avoids the danger of breaking the glass shades or bulbs, besides eliminating the unsightly cord extending out of the globe. It is stated that this socket will meet the demand for an extra outlet for the table lamp, boudoir lamp, percolator, toaster, iron cleaner and various other electrical appliances. It is further claimed that it will not destroy contour of fixture, is concealed within the fixture body, no soldering, tapping or bridging, ties body shells together, quickly installed in any fixture. The removable screw plug is supplied in the following finishes: rich gilt, flemish, butler silver.

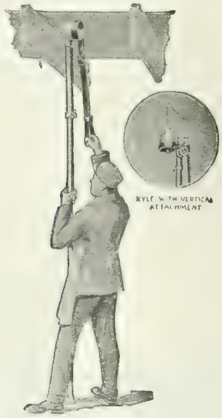
Extension Candle Socket

A new extension candle socket has been recently placed on the market by the Connecticut Electric Manufacturing Company, Bridgeport Connecticut. The device is well shown in the accompanying illustration. It is said to be especially strongly constructed so that the extension is rigid and does not require adjustment. The wires pass up through the centre of the socket so that it can be screwed into place without untwisting them. An adjustable bushing and lock nut are included in the assembly.



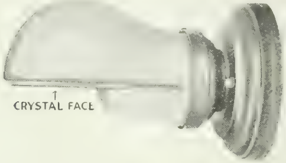
Kyle Boring Device

The Ren Automobile Supply Co., Preston, Ont., are marketing the Kyle Boring Device, a small machine that will bore holes in almost any position. It is especially recommended to wiring contractors. The head is made of 14 gage steel and has only three parts. Bushings are of phosphor bronze. The ratchets are case hardened. The bit is specially designed for this machine and has a round shank with flat notch for bit set screw. Any other electrician's bit may be used, however, by cutting off the square shank. The drive strap is, of woven fabric, 10 feet in length. A stirrup foot rest is used, fastened on the base of the smallest of the telescoping tubes. This is used to steady the machine and after the bit has started to cut, the operator can use both hands on the pull strap. A special attachment is furnished for old house-wiring, by which holes can be bored under the floor. This is a small crosspiece which is clamped around the telescoping tube at the desired depth. The device is claimed to save money on any wiring job. Distributors are wanted in different districts.



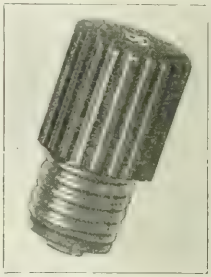
Wall Bracket of Novel Type

The Reflectolyte Company, 914 Pine St. St. Louis, Mo., are marketing a novel type of wall bracket, which they list under the heading "H R". This bracket is equipped with a half-shade, the lower horizontal surface of which is closed. The half-shade, blown in one piece of crystal glass, is opal enameled all over, except the flat horizontal lower face which remains crystal. This clear surface is provided to permit the unobstructed exit—to the lower hemisphere—of the light reflected forward and downward by the enameled walls of the shade These brackets are made with metal parts plain and ornamental and to accommodate standard S-17 lamps in 10, 15 and 25 watt capacity, and P-19 Mill type lamps in 25 and 50 watt capacity. The manufacturers state that it is a dustless, glareless side bracket which, while supplying ample, well diffused, general illumination, directs a large volume of reflected light to the working plane beneath the fixture. They are claimed to be ideal for use in hospitals, in tellers' cages and over check-desks in banks, and many locations in hotels, apartment buildings, and homes. Stock is satin brass finish. Also supplied in maltese grey applique and Maltese grey fused-on porcelain enamel finish.



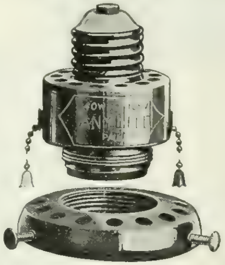
Federal Three Thirty Fuse Plug

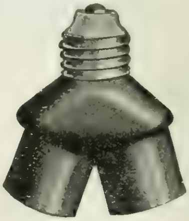
The Federal Electric Company has recently placed on the market a new renewable powder packed fuse plug, which is claims will save the blowing of plugs because of the time element feature, and also will save small motors and apparatus from being destroyed. The time element feature and powder-packed renewal element which is used in the fuse plug is said to solve the problem of taking care of the excess currents of short duration due to starting torque and small line surges; eliminating the necessity of using a plug three to four times the rating required to take care of the normal running current in order to withstand the short duration excess currents. Its construction embodies three parts. These are the outer case, the cartridge holder, and the powder-packed renewable cartridge; it can be reloaded without the use of any tools. The plug is built to with-stand short-circuits and ordinary overload blows, without injury to the holder itself. Large contact surface and substantial metal are used to give good contact. This new plug is called the Federal Three-Thirty renewable fuse plug. The same renewable element that is used in this plug is used in their regular 3-30 ampere 250 volt cartridge fuse.



Twin Socket and Regulator

In a recent issue we announced that a new side outlet plug had been placed on the market by the Anylite Electric Company of Ft. Wayne, Ind. We explained that its construction was similar to the Anylite twin plug, the cover being of cold molded insulation and the legs of hard vulcanized fibre. Two other items manufactured by the same company are illustrated herewith. Anylite products are distributed in Canada by the Dominion Carbon Brush Company, Toronto.





Current News and Notes

Calgary, Alta.

The Bloor Electric Co., electrical contractors, 1038-18th Avenue East, Calgary, Alta., were recently awarded the contract for wiring and lighting fixtures for a $10,000 bungalow, on 15th Avenue and 5th Street, Calgary for R. G. Christie.

The Brotherston Electric Co., of Calgary, Alta., have just been awarded the contract for wiring; installing fixtures; a generating plant with 110 volt, 6 kw. dynamo, and storage batteries, for the Old Suns Boarding School, Blackfoot Reservation, New Gleichen, Alta, Dept. of Indian Affairs, Ottawa; estimated contract $3,000.

W. L. Lee, electrical contractor 1030-16th Avenue West, Calgary, Alta., was recently awarded the contract for wiring, lighting fixtures, 3 fire places, hot water heater and electric range, for a $17,000 house for A. B. Himmelam. 1722-9½5 Street, West, Calgary; also contract for two houses for Hornibrook, Whitmore and Allan, 10th Street and 8th Avenue West, owners; and a third contract for three houses for W. Graves 1307-11th Street.

The Crane-Cassidy Electric Company of Calgary, Alta., were recently awarded the contract for wiring and piping for one store and twelve office suits, which is a remodelling of the old Bijou Theatre for McKenzie estate, Calgary.

Campbellford, Ont.

It is reported that the Hydro-electric Power Commission of Ontario plans to build a new power house at Lock No. 8, near Campbellford, Ont.

Cloverdale, B. C.

The ratepayers of Surrey recently passed a by-law authorizing the expenditure of $3,000 for repairs to Nicomeki River dam.

Edmonton, Alta.

The lighting system in North Edmonton will be extended soon.

Ford City, Ont.

The Hydro-electric Power Commission of Ford City, Ont., are planning extensions to the service. The main extension will be on Droiullard Road, from Seminole Street to Tecumseh Road.

Halifax, N. S.

The city council of Halifax has decided to accept a contract with the Nova Scotia Tramways & Power Co. whereby that company will look after the city's street lighting for the next fifteen years at a cost to the city of approximately $75,000. The agreement approved was drawn up by the city solicitor, the city engineer, the city electrician, and Messrs. Weston and Covert, the two last named representing the Tram Company.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Hamilton, Ont.

A report has been submitted by R. S. Kelsch, consulting engineer, Montreal, to the city council of Hamilton on the proposed construction by the Hydro Commission of a line of power towers across the Beach. The report is said to agree with the Commission's plans.

Kenora, Ont.

By-laws have recently been passed by the town council of Kenora, Ont., for the raising of $7,433 to extend the telephone system and $4,610 to extend the electric lighting system.

Kerrisdale, B. C.

A by-law for the installation of a municipal street lighting plant will be submitted to ratepayers by Point Grey Council.

Lake Megantic, Que.

The town council of Lake Megantic, Que., plans to construct a dam for the storage of water for power purposes. Construction will be supervised by J. O. Mignault, of Sherbrooke. An approximate cost of $100,000 is given.

Montreal, P.Q.

Mr. I. D. Livinson, who for a number of years was with the Victoria Electric Supply Company, has opened a temporary office at 121 Bleury St., Montreal. Mr. Livinson has secured the eastern representation for E. H. Freeman Electric Company, Trenton, N. J.

Mr. Irving Smith, dealer in electrical apparatus and specialities, Montreal, and known to the trade for many years, has moved from 512 New Birks building into more extensive premises at 275 Craig Street West. Mr. Smith will be remembered as the former vice-president and general manager for the R. E. T. Pringle Company Ltd., but, he has been in business for many years on his own account.

Nelson, B. C.

A by-law was recently passed by the ratepayers of Nelson, B. C., authorizing extension of the electric service lines to the north of the west arm of Kootenay Lake.

Niagara Falls, Ont.

A by-law recently passed by the city council of Niagara Falls, Ont., provides for the raising of $100,000 for the improvement of the electric light system.

Peterboro, Ont.

G. A. Bell, Deputy Minister of Railways and Canals, Ottawa, recently stated that contracts would be let at once for construction of dam at Young's Point, near Peterboro, Ont.

Port Dalhousie, Ont.

A by-law was recently passed by the municipal council providing for raising $5,000 for extending and improving the Hydro-electric system.

Quebec, Que.

At the meeting of the board of directors of the Public Service Corporation, four new directors were elected as follows: James Wilson, of Montreal; Hon. P. J. Paradis, Mr. J. H. Fortier, and Eugene Tanguay, of Quebec. The officers elected were: President, Julian C. Smith; vice-president, Howard Murray; treasurer, W. S. Hart; managing director and secretary, Eugene Tanguay. The other directors are C. H. Branchaud, Milton Hersey, John T. Ross, J. Emile Tanguay, C. E. Taschereau and George Parent, M.P. The usual quarterly dividend at the rate of 5 per cent. was declared. Receipts were announced by the president as being higher than those of the last year and business most satisfactory.

Application is being made at the forthcoming session of the Quebec Legislature to alter the present system of the Quebec Railway, Light, Heat & Power Company, by dividing the various branches of the company and having them incorporated into three district companies which will be known as:—The Quebec Power Company, the Quebec Gas Company and the Quebec Tramways Company.

St. Catharines, Ont.

The city council at a special meeting on Oct. 14, passed a resolution ratifying the by-law passed by the ratepayers in favor of the Hydro-radial line from Port Credit to St. Catharines.

Sarnia, Ont.

It is reported that extensions will be built so Hydro power will be available in Froomfield and Corunna, near Sarnia, Ont.

Stevensville, Ont.

The village of Stevensville, which is served by a rural Hydro line, was recently without electricity for two and a half days. Workmen searching to find the cause of the trouble found that a muskrat had chewed the cable and had been electrocuted.

Contractor-Dealers' Convention, Toronto, Nov. 13 & 14

Toronto, Ont.

J. S. Torry, a Toronto electrical contractor, has recently opened a store at 407 Roncesvalles Avenue, Toronto, and is dealing in electrical fixtures and appliances, as well as contracting.

Despite a surcharge of $76,929 for electric power imposed by the Provincial Hydro after the year's operation had closed, the Toronto Hydro-electric System made a net surplus of $214,353.31 during 1921, according to the report for the year. The financial position of the system as at December 31, 1921, is given as follows:

Gross income, $3,622,605.23; cost of current, operation and management, including repairs and maintenance, $2,212,373.95, leaving a gross surplus of income over operating account of $1,410,231.28. Of this amount $1,195,877.97 was absorbed by interest, depreciation, exchange, taxes, sinking funds and debenture retirals, leaving a net surplus of $214,353.31. The report further states that during 1921, 81,923 meters were in use; 221,384,558 kilowatt hours were sold; the connected load was 227,600 h.p. and the peak load 76,378 h.p. The general manager's report shows that in 1921 the number of customers increased by more than 10,400, the connected load by 32,800 h.p., and the total energy consumption by 6,400,000 k.w.h.

Twin Falls, Ont.

The Abitibi Power & Paper Co., Montreal, have placed an order with Smart-Turner Machine Co., Hamilton, for a No. 8 vertical centrifugal pump, to be driven by 25 h.p. motor, to be shipped to Twin Falls, Ont.

Walkerville, Ont.

The town council of Walkerville, Ont., plans to instal Hydro lamps on Wyandotte Street, between Kildare and Walker Roads.

Weston, Ont.

It is expected that construction of a new electric station will shortly be proceeded with at Weston, Ont. This will involve an outlay, stated to be about $10,000.

Windsor, Ont.

Mr. F. D. Reaume, has moved his store premises to 927 East Wyandotte St., Windsor. The new store will contain a much larger stock than the old one. Mr. Reaume states that the change has been made necessary by the increased volume of his business.

Winnipeg, Man.

The Great West Electric Co. Ltd., Winnipeg, have just made arrangements to handle the "Rainaud" portable lamps in Western Canada, which line embraces a large range of portable lamps of every description.

Come to the Convention, Nov. 13 and 14.

The following contracts have been recently let by the City Council of Winnipeg: Canadian Westinghouse Co., Winnipeg, constant current transformers and fixtures, $5,645, and series automatic cutouts, $1,217; Northern Electric Co., Winnipeg, glassware, $3,363; Canadian General Electric Co., electrodes, $7,235.

York Twp., Ont.

York Township Council will obtain an estimate of cost from the Hydro-Electric Power Commission for a better lighting system for Fairbank district.

Yarmouth, N. S.

Mr. K. H. Smith, chief engineer of the Nova Scotia Water Power Commission, recently outlined a scheme of Hydro development for the east branch of the Bear River. It is estimated the cost of the scheme would be around $11,150,000, and it would eventually supply the north shore of Nova Scotia from Yarmouth to Middleton. Mr. Smith said that while the preliminary plans for the scheme were not complete, he was satisfied it was sound. Distributing stations under the plan would be at Middleton, Bridgetown, Annapolis, Bear River, Digby, Weymouth, Port Maitland, and Yarmouth.

Wiring Contracts Awarded

Aylmer, Que

Stan Lewis, 63 Metcalfe Street, Ottawa, on res., Aylmer Road.

Bowmanville, Ont.

Gus Bounsal, $5,000 res.

Ford City, Ont.

G. S. Whelpton, 856 Hall Ave., Windsor, $100,000 on school .

Fredericton, N. B.

Wm. Boom, North Devon, York Co., N. B., $3,500 each 3 res., Aberdeen St.

Halifax, N. S.

Arthur & Conn, Argyle Street, $5,000 res., Henry St.

Hamilton, Ont.

T. J. Murphy & Son, 241 Robert St., $7,500 store, Aberdeen & Dundurn.

Kingsville, Ont.

Harris & Russell, $4,000 res., Prince Albert St.

Lachine, Que.

Jas. Bellefeuille, St. Joseph St., $5,000 res., semi-det., Broadway Ave.; $5,000 semi-det., res., Broadway Ave.

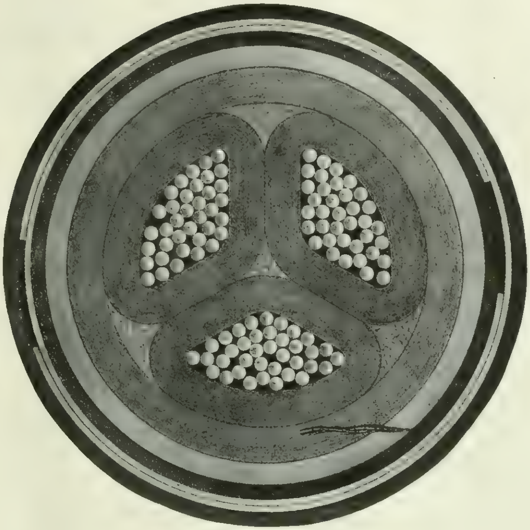
London, Ont.

Bowley Electric Co., 306 Dundas St., $30,000 add. store.

Maxville, Ont.

R. J. Desjardin, $12,000 hotel, Car & Main Streets.

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt
Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.

Built to Specification of Hydro-Electric Power Commission of Ontario

Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

Moncton, N. B.

Wm. G. Crowley, St. George St., $4,800 res., West St.; $3,500 res., High St.

Edgar Leblanc, Church St., $4,000 res., Bonnacord St.; $15,000 stores & res., John & High Sts.

Thos. Johnson, Main St., $5,000 res., Kent St.

Geo. McCall, Main St., $4,500 res., Pine Street.

G. F. Perry, Church Street, $5,570 res., Enterprise St.; $3,800 res., Enterprise St.

Montreal, Que.

J. O. Beaulieu, 2422 St. Urbain St., $24,000 res., Park Ave.

R. Chamberland, 16 Garnier Street, $10,000 flats, Brebeuf.; $8,000 res., Garnier St.

Eug. Choquette, 2090 Park Ave., $8,000 two flats, Hopper St.

A. Daoust, City Hall Ave., $7,000 res., 62 Old Orchard Ave.

Chas. Egan, 3326 Verville Street, $7,000 alt. packing house, 14 Chaboillez Sq.

A. Forget. 157 Monk Blvd., $7,000 res., Belgrave Ave.

G. Houle, 200 Boyer St., $10,000 public garage, Beaconsfield.

J. Lamarre, $14,000 two res., 394 Chambord St.

Philip Lahee & Co., 3 St. Nicholas St., $60,000 factory, Dufresne.

J. Martel, N. D. G., on 14 res., Old Orchard.

J. A. St. Amour, 2171 St. Denis Street, $156,000 school (St. Stanislas) St. Joseph Blvd.; $154,000 school & res., Demontigny St.

Sayer Electric Co., 87 Bleury St., $15,500 church, Hochelaga Dist.

D. Vanasse, 810 Papineau Ave., $8,000 3 flats, Delaroche.

Ottawa, Ont.

H. L. Allen, 272 Bank St., $7,000 res., Powell Ave.; $7,000 res., Broadway Ave.; $4,000 res., Rochester St.

P. Ackroyd, 416 Bank St., $16,000 res., Monkland Ave.

Mr. Brown, $5,000 res., Harmer Ave.

Art. Davis, LeBreton St., $8,000 2 res., Dorothy Ave.; $7,000 res., Findlay Ave.; $7,500 res. & garage, Broadway Ave.; $4,500 res., Riverdale Ave.

J. A. Ellicott, Bank St., $10,000 bible house.

E, Headly, 645 Echo Drive, $13,000 2 res., 3rd Ave.; $5,000 res., 3rd Ave.; $5,000 res., Fentiman Ave.; $5,000 res., Farraday Ave.; $5,000 res., Sunnyside Ave.

Mr. Lee, $4,000 res. & garage, Renfrew Ave.

Marchand Electric Co., Bank National Bldg., $8,500 res., Driveway.

Rideau Electric Co., Daly Ave., $3,500 res., Geneva Ave.

Stan Lewis, 63 Metcalfe St., on bakery.

Port Arthur, Ont.

A. O. Waltz, Port Arthur, $23,000 stores Arthur St.

St. Louis De Corville, Que.

A. Minard, $15,000 add. school.

Sandwich, Ont.

McNaughton McKay Electric Co., Sandwich, $205,000 school. Felix Ave.

Sault Ste. Marie, Ont.

O. C. Carney, 516 Queen E., $4,000 add. & alt. res., Summit Ave.

Rapid Electric Co., 725 Queen St., E., $7,000 business block, Wellington Street.

Smiths Falls, Ont.

Alex. Baker, $4,100 res., Becwih St.

Stratford. Ont.

Bennington Electric Co., Ontario St., $58,000 school, "Ann Hathway," Downie St.

Jas. Brandy, Cobourgh St., $3,500 res., Youngs St.

W. Gaul, Charles St., on res., Water Street; $3,000 res., Romeo St.

Toronto, Ont.

T. W. Findlay, 81 Brooklyn Ave., $7,000 res., North End Private St.

E. Forsey, 11 Pendeen Ave., Mt. Dennis, $5,000 each 1 pr. res., Earlscourt Ave.

Harris & Marson, 81 Parkway Ave., $7,500 each two stores & apts., 227-9 Roncesvalles Ave.

E. H. Hillier, 232 Bain Ave., $4,500 res., Woodycrest Ave.

J. W. Howard, 74 Russett Ave., $10,000 each 5 res., 572-580 Windermere Ave.; $10.000 res., 284 Kennedy Ave.

W. Hughes, 24 Duneaton Ave., $7,000 res., Chesterhill Rd.

Hyglo Electric Co., 2021 Yonge St., $8,000 each 3 stores & apt., Yonge Street.

Mr. Kent, $18,000 res., Graham Rd.

N. McLeod. 808 Danforth Ave., $4 500 res., Browning Ave.

Mather Electric Co., 1479 Yonge St., $3,500 each, 2 res., Montgomery Ave.

R. Mitchell, Danforth & Greenwood Aves., $6,000 1 pr. res., Strathmore Blvd.; $6.000 a pr. 2 pr. res., Strathmore Blvd.; $6,000 res., Strathmore Blvd.; $5,000 each 2 res., Coxwell Ave.

W. F. Moon & Co., 2924 Dundas W., $15,000 res., Sevington & Belsize Dr.

Nichol & Fagan, 111 Logan Ave., $8,000 1 pr. res., Soudan Ave.; $6,000 Coxwell Ave.

Wm. Priest, 668 Bloor St., West, $4,000 bungalow, 176 Earlscourt Ave.

Roxborough Ltd., 36 Front St. East, $9,000 res., Heath St. & Clifton Rd.

S. Smith, Cedarvale Ave., $6,500 res., Coxwell Ave.

E. B. Swackhammer, 33 North St., $15,000 res. (2 family) Thurloe & Belsize Dr.

Taylor Bros., 25½ Norwood Rd., $6,000 each, 4 res., Strathmore Blvd.; $6,000 each 2 res., Strathmore Blvd.; $6,000 bungalow, Strathmore Blvd.; $4,500 each 2 res., Arundel Ave.; $4,000 each 2 res., Beck Ave.; $6,500 each 2 bungalows, Strathmore Blvd.; $7,000 bungalow, Strathmore Blvd.

B. C. Taylor, 25 Marchmont Rd., $12,000 2 res., 343-5 Indian Grove; $4,500 each 5 res., Harcroft Rd.; $12,000 bungalow, Bloor St.; $8,000 res., 28 Glendale Ave.

E. H. Warman, 209 Soudan Ave., $5,000 res., Soudan Ave.

Vancouver, B. C.

T. E. Corrigan, 571 Howe St., $100,000 stores & apts. 523-29 Granville St.

Victoria, B. C.

Hawkins & Hayward, 1607 Douglas St., Vanc., $9,300 res., 1495 Rockland Ave.

Waterloo, Ont.

Otto Reiber, King Street, $5,000 res., Noecker St.

Westmount, Que.

J. A. Roy, 2561 Park Ave., on pr. res., Cote Rd.

Winnipeg, Man.

Western Elev. & Motor Co., Ltd., 183 Notre Dame East, Wpg., $45,000 building. 317 Portage Ave., (Kennedy Bldg).

Company Incorporations

Wat Electric Manufacturing Company, Limited, $500,000 Winnipeg; manufacturing, etc., of all kinds of electrical equipment.

Dominion Radio Supplies, Limited, $40,000. Guelph.; manufacturing and generally dealing in radio and other equipment.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

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The "Clean-up Deal"—$32,734,000

The "clean-up" deal recently consummated by the Ontario Hydro-electric Power Commission represents one of the biggest electrical transactions ever put through in North America.

The properties involved are valued at $32,734,000 and include the Toronto Power Company, Limited, Electrical Development Company, Toronto and Niagara Power Company, Toronto Electric Light Company, Toronto and York Radial Company, Schomberg and Aurora Railway. These properties are popularly known as the "Mackenzie Power Interests" and their taking over by the Hydro-electric Power Commission represents the climax of several years of negotiations.

On Dec. 3, 1920, the basis was reached for the agreement, which is now ratified. The intervening time has been required for the approval of by-laws by the electors, the passing of by-laws by council, legal framing of agreements and the clearing away of incidental matters.

Under this agreement the resignations of all the directors of companies controlled by the Toronto Railway Company, the vendor, are tendered, and the company will cause to be terminated the employment of all officers of the controlled companies and of any other persons employed.

The agreement provides for its authorization by the lieutenant-governor-in-council and the guarantee of the bonds by the province. It also provides for the suspension of litigation.

The commission is protected in the agreement from future claims on account of the transmission right of way and $4,000,000 is retained until 1924 to meet any such claims as may be proved. The commission also agrees to pay when the same become due the guaranteed debenture stock of the power company secured by deed of trust between the power company and the British Empire Trust Company. The government agrees to guarantee these bonds to the extent of $13,500,000.

The consummation of the agreement, of course, removes competition with the Hydro, automatically extinguishing the wide powers held by the Toronto Railway Company. It is unlikely that any radical change will be noticeable in the near future. Efforts are being made to retain as many as possible of the former employees and it seems likely there will be little change in this direction. The whole transaction is an evidence of the strong hold that public ownership has on the minds of Toronto voters.

A Standard Code for the Electrical Industry

On Thursday the 2nd November, about 85 members of the Manitoba Electrical Association gathered at the Fort Garry Hotel, Winnipeg, to listen to an address by Capt. R. J. Durley, secretary of the Canadian Engineering Standards Association, Ottawa, Ont. Capt. Durley outlined the plans for a Canadian National Electric Code and National Bureau of Inspection. He stated that the Standards Association has the support of the Federal Government, and the Department of Trades and Commerce, and already committees have been formed to deal with various subjects, such as electrical, cement, concrete, etc.

The subject of a National code is of great interest and importance to the whole Dominion, but those particularly interested are municipalities, power companies, engineers, architects, fire underwriters, insurance companies, manufacturers of electrical equipment, electrical jobbers and dealers, electrical railways, etc.

It is most necessary to obtain and adopt uniform requirements throughout the Dominion with regard to the design, quality, and installation of electrical appliances and equipment. This refers not only to appliances employed inside buildings, but also to the conducting systems connecting such installations with their source of supply. By having a National Code it would be the means of putting a stop to the importation of defective appliances and material.

At the present time the whole electrical industry is being put to a lot of unnecessary inconvenience and loss, on account of the variety of conditions that exist in the various provinces, as appliances and material that are regarded as satisfactory in one province, may be objected to in another. Manufacturers are called upon to produce an unnecessary number of varieties and types of material or equipment. Due to the necessity of meeting divergent local requirements, dealers and jobbers have to carry an unnecessarily large stock, with resulting expense to the public. In many cases the public are being supplied with inferior and dangerous articles, especially so in the case where the goods have been imported from a foreign country.

The formation of a Code would necessarily have to be followed by arrangements for testing, examining and approving electrical appliances at a central approving laboratory of the kind that has already been established in Toronto by the Hydro-electric Power Commission of Ontario. At such a labaratory, equipment purporting to comply with the rules adopted in any province could be examined and officially certified as satisfactory. Such work would derive additional authority if it were carried out under the auspices of the Dominion Government. Possibly activities of this kind would come within the scope of the Research Institute and Bureau of Standards which is proposed at Ottawa.

Should it be found possible to interest the provincial governments in this important question, the Canadian Engineering Standards Association, as a Dominion-wide body dealing with engineering problems of this kind, would be enabled to form a widely representative working committee to deal with the technical aspects of the case, and thus secure general agreements by consultations between representatives of various provinces and other interests concerned.

Mr. George Wright who acted as chairman then asked for opinions. L. M. Cochrane said the Province should strongly support Capt. Durley if only in the interests of the consumer, who is now penalized by the want of a code. E. V. Caton said we have the Fire Code but that does not apply to life; what we want is a National Code for Canada to make a legal standard, as today one municipality differs so much from another.

The following motion was presented by E. V. Caton, seconded by J. Rocchetti and carried unanimously:

> That the Manitoba Electrical Association is vitally interested in the work of establishing a Canadian Code and that a committee composed of Messrs. Martin, Wright, Dickson and Cambridge be appointed to confer with the Engineering Institute of Canada, Winnipeg Branch, for the purpose of having them appoint delegates to co-operate with this Association, to urge on our Provincial Government the advisability of their participating in the proposed conference at Ottawa.

L. B. Dixon said the Contractor-Dealers' Association and The Manitoba Electrical Association have been very interested in the subject of standardization. Material often approved of in Ontario is quite frequently turned down in Manitoba; therefore it had to be returned to the manufacturers. The manufacturers would certainly like to have a standard to work by. M. E. Deering said everyone should support the National Code and referred to the speaker of the last luncheon who was a layman, who stated he had about a dozen electrical appliances in his home and that no two of them had the same kind of plug. J. G. Glassco thought that there are untold advantages to be derived from the Standards Association, which body should be supported financially and not run on the same lines as the Society for the Prevention of Cruelty to Animals.

"Bus-Bar Stresses"

At the November 3rd meeting of the Toronto Section A.I.E.E., the chair was occupied by Mr. S. E. M. Henderson. Mr. Henderson in his introductory remarks reminded the members of the fact that there were two prizes for authors of papers, established by the American Institute in 1921 and both are open for competition this year. Each prize is for $100.00. He outlined the conditions for competition and urged the members to try for these prizes. The chairman also advised the meeting that the Executive of the Toronto Section passed a motion at their last meeting offering for competition among the members of the Toronto Section, a prize of $25.00 to the author of the most worthy paper on any electrical subject presented during the season of 1922-1923. The executive of the Toronto Section will be judges.

Mr. Henderson then introduced the speaker of the evening, Mr. C. H. VanAspirin of the Hydro-electric Power Commission Laboratories, who presented a paper on "Mechanical stresses in bus-bars under short circuit conditions."

Following a request to the Commission for a simple formula for stresses in bus-bars, at right angle bends, which could be readily applied—and after a vain attempt to arrive at one mathematically—Mr. VanAspirin undertook to measure the forces. His work in this connection was the substance of his paper. Many obstacles were encountered, but finally his labors met with complete success. After plotting the measured readings an equation was discovered which satisfied the curve. In order to locate bus supports to the best advantage to withstand these forces, certain constants were plotted which may be applied with the greatest of ease to suit various conditions of bus construction. In these measurements the maximum forces measured did not exceed 1/2 ounce while deflections of the order of 3/100 mils were read.

Following the paper, Mr. Dobson read a discussion by Mr. H. B. Dwight and Mr. A. H. Hull showed some slides with curves of short circuit currents and bus stresses, as calculated on the buses at Queenston generating station. Professor Rosebrugh also outlined a method by which the bus stresses at right angle bends could be calculated.

C. E. A. Proceedings are Out

The Annual Proceedings of the Ottawa Convention of the Canadian Electrical Association are just off the press and have been mailed to all the members of the Association. Non-members can obtain the book upon application to the secretary, 65 McGill College Avenue, Montreal, enclosing one dollar, the cost of printing. It is the largest book issued as yet by the C.E.A., containing 221 pages of papers and discussion of the following reports: Report of Membership Committee; Report of Committee on Public Relations; Report of Commercial Section; Report of Power Sales Bureau; Report of Merchandise Sales Bureau; Report of Lighting Sales Bureau; Report of Meter Committee; Report of Electrical Apparatus Committee; Report of Underground Systems Committee; Report of Overhead Systems Committee; Report of Lamp Committee; Report of the Accounting Section; Report of Classification of Accounts (National Section); Report of Accident Prevention Committee; Report of the Inductive Interference Committee; Report of Rural Lines Committee; Report of Canadian Member Rural Lines Ct'ee. of N.E.L.A.

The reports are well illustrated by photographs and charts making it a very valuable reference book

Besides, it contains also a valuable paper of Mr. Samuel G. Hibben, illuminating engineer of the Westinghouse Co., on "Fundamental Principles of Illumination," a stimulating address by president Julian C. Smith, and an address of Mr. Frank W. Smith, president of the National Electric Light Association; also addresses by Hon. Walter Mitchell and Lawrence W. Davis, special representative of the National Contractor-Dealers Association, New York, on the problems of the electrical contractor-dealer as affecting the electrical industry.

British Industries Fair

The British Industries 1923 Fair, the annual exhibit established in 1915 and held simultaneously at London and Birmingham, will be open from February 19 to March 2. This is the trade buyers' annual opportunity to inspect the products of Empire manufacture. It is not an exhibition in the ordinary sense; it is a Trade Fair to which admittance can only be gained by trade buyers. Everybody at the Fair, consequently, will be there on business and exhibitors and buyers will be able to transact their affair unhampered by crowds of sightseers. This Fair will embody all that is best in British industrial effort.

The Application of Electricity in the Manufacturing Industry--10

Steel Industry Highly Electrified—Blooming Mill Drive Involves Specialized Application of Electric Motors—Comparison of Steam and Electrically Driven Mills—Material Handling by Electricity

Electrification has proceeded rapidly in the steel industry. At the present time the modern steel mill is 95 per cent electrified. This desirable condition is the direct result of unfavorable operating conditions for steel manufacture. Close competition has compelled the strictest scrutiny of costs with the result that electric drive has been almost universally adopted.

This widespread electrification, applying to the most varied operations of steel manufacture and including practically all the known uses of electric power, presents such a broad subject that it is impossible to give even an adequate summary of it in a single article. It is proposed, therefore, to deal only with the more outstanding applications.

Blooming Mill Drive

The discussion of blooming mill drive is inevitably a statement of the advantages of electric drive over steam engine drive. It is to be noted that in the past, adequate figures for comparison have not been available; recently, however, actual statistics have been compiled and seem to show considerable advantage for the electric motor.

It is authoritatively stated for one particular installation that 1090 pounds of steam were used per ton of steel rolled. Electrification was proceeded with and it was found that even during intermittent operation, only 25 kw.h. of electricity were used per ton of steel rolled. On the basis of 14 pounds of steam per kw.h. generated, this is equivalent to 336 pounds of steam per ton rolled.

Blast Furnace plant of Algoma Steel Corporation, Sault Ste. Marie, Ont., showing electrically operated ore bridges, ore distributing cars and furnace charging skip hoists

The change from steam to electric drive involves the substitution of an equivalent for the reversing engine which is used to drive the mill. This is sometimes done by the installation of a flywheel motor-generator set driving a direct-current motor connected to the rolls. In such installations the main roll motor has to be of special construction to withstand the severe shocks of reversing service. Large quantities of air are used, generally furnished, washed and cooled by spray conditioning apparatus. This air is sometimes taken up from the pit underneath, through a casing over the back of the armature and discharged at the commutator end.

In Atlantic Steel Company's Plant

In the plant of the Atlantic Steel Company, the reversing roll motor, which is compound wound (equivalent) has two separately excited fields fed from a three unit motor-generator set, which has a 50 h.p. 2,200 volt induction motor driving a 25 kw. 125 volt, direct-current constant potential generator, and a 75 kw. direct-current generator supplying the series winding on the roll motor fields. The voltage of the latter is proportional to the motor armature current.

The armature leads are connected through a circuit breaker, to the armature leads of the generator on the flywheel-motor-generator set. This generator is an 1,800 kw. machine of the same characteristics as the main motor, and has its fields separately excited from the 25 kw. generator. On the same shaft is a 1,600 h.p. three phase, 60 cycle, 2,200 volt, slip ring induction motor, and a 60,000 lb. flywheel built up of boiler plate. The synchronous speed of this set is 514 r.p.m.

The switchboard panels are for controlling the induction motor on the motor-generator set, exciter and air washer, and for direct current from the two exciter generators. A circuit breaker panel is placed between the main motor and generator. Control of the speed and direction of the roll motor is by means of a panel board of contactors and relays, which operate the fields of the motor and its generators. Mounted in the mill operator's pulpit is the master controller, a small single-lever affair, with an indicating board showing the voltage and load in the mill motor. Connection to the mill is made through universal joint couplings, a 30 in. helical cut tooth pinion set, and universal joint couplings on spindles,

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*For certain of the information contained in this article we are indebted to papers before a recent convention of the association of Iron and Steel Electrical Engineers; photos courtesy Algoma Steel Corporation.

All of the electrical apparatus and the pinions are enclosed in a separate steel building to keep out dust and scale.

Wiring to the Mill

Power lines are brought in underground in lead cable and distributed to various plant circuits through oil circuit breaker panels, with ammeters and watthour meters which give the basis for power charge to various departments. All wiring for the high tension circuits in the motor room is in fibre conduit set in concrete, while all low-tension wiring is in iron conduit.

Connections between the motor and the generator are made with bus-bar copper in a concrete tank with an iron cover. These bus-bars are supported on heavy insulators and braced at frequent intervals with strain insulators to prevent distortion due to sudden rushes of current. Ventilating air is carried through a waterproof concrete tunnel.

Layout of Motor Room and Blooming Mill

The layout of the motor room and blooming mill is given in Fig. 2. With the flywheel up to speed, and the exciter and blowers running, the cycle of operations is the same as is used in the operation of compound-wound reversing motor. The connections are shown in Fig. 2. Closing the circuit breaker between the roll motor and the generator causes the contactors automatically to excite the roll motor to full shunt field strength. At this time the flywheel generator has no field, consequently no voltage.

When the pulpit operator throws his master controller on one point, it closes contactors on the control panel which puts field current, in service with resistance, in the generator fields. The voltage builds up rapidly and the motor begins to revolve. Further steps on the master controller cut resistance out of the generator field until the voltage of generator reaches 600 volts. At this point the motor has full field and maximum torque with a speed of 70 r.p.m. Speeds above this are obtained by other points on the master, which open contactors, inserting resistance in the motor fields until the maximum speed is reached. The usual operation, however, is to put the master on the first point, and when the rolls bite, to throw the lever to the full speed position. On short passes, the piece is through the rolls before maximum speed is reached. In any pass, should excessive speed for the draft occur, a relay will strengthen the field of the motor, limiting the load to a safe value. This is rarely needed except with cold steel or cold spots in ingots or trying to take too heavy a draft.

Comparison of Steam and Electric Drive

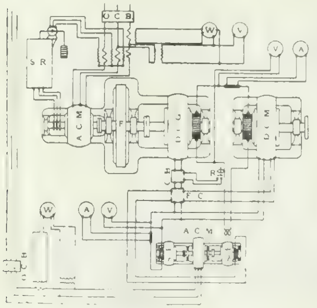
Since this mill has been driven both by steam and electric motor, it is interesting to make some comparisons of operation, the power costs, delays and the like. Data on the engine is available for 10 years, but the years 1915-1920 have been taken as representative. The electrical data is for six months in 1921, and six months in 1922. In 1921 the mill could not be run to capacity, due to a shortage of ingots, but in 1922 this feature has almost disappeared. Both drives have operated with the same equipment, with exception of a new soaking pit crane which replaced the old one in 1921. Nearly all operation of both drives has been single turn of 10 or 12 hours. Turns are figured on a twelve hour basis in all calculations. In figuring steam cost in Table 1, 25 per cent of the actual steam was credited to the engine and charged to the turbines. The steam used was about 1060 lbs. per ton of steel, while the average power per ton of steel is about 24 kw. Table 1 gives a good comparison, as the year 1915 was good in tonnage and cost. In this mill there is now no question as to the superiority of electric drive.

Table 1—Blooming Mill Operating Data

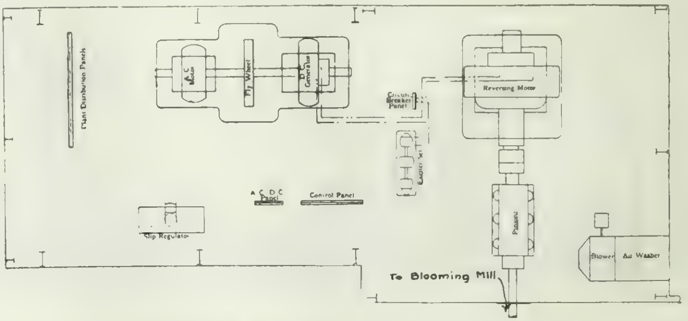
Drive	Year	Per cent Power cost per ton	Per cent Repair cost to drive per ton	Per cent Delays per ton caused by drive	Per cent Tonnage per turn	Per cent Cost of attendance per ton
Steam	1915	100	100	100	100	100
Steam	1916	106	187	123	91	110
Steam	1917	161	224	140	82	115
Steam	1918	189	280	195	87	150
Steam	1919	192	184	119	99	168
Steam	1920.	263	180	139	97	180
Elect. 6 mo.	1921	52	48	60	107	84
Elect. 6 mo.	1922	48	38	28	125	72

Repair and Upkeep

Repair and upkeep cost of the electrical apparatus, is much less than on the engine. Not only does the force actually at work consist of less men, and the time put in less hours, but also the shops are not so busy making spare parts, nor is the overhauling gang in demand at regular intervals. As to delays, the electrical equipment has a decided advantage. The engine was a constant source of trouble and delays were looked for as an unpleasant necessity. The electrical delays have been very few, consisting mostly of switches stuck in, or coils burnt open, or fuses out, caus-



Schematic diagram of connections for reversing blooming mill, Atlantic Steel Co.

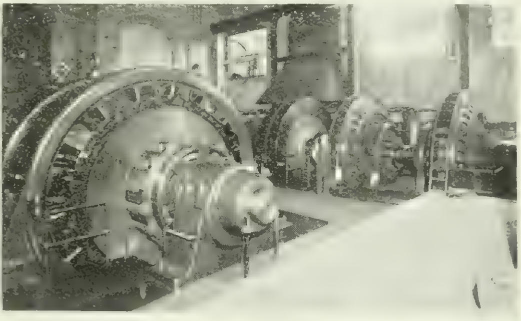


Plan of Motor room layout, Atlantic Steel Company ing only a few moments stop. The most serious stop was chargeable to faulty installation. There was a three hour stop to pump water out of the ventilating air duct for the reversing motor on starting up at the beginning of a week's run. This air duct was afterward water proofed as it was found that continued wet weather would saturate the soil enough to soak through the concrete duct.

Greater Tonnage Obtained

Although the engineer on the old drive is now the motor operator on the blooming mill, it has been found that it requires a man much less skilled than with the engine, and the question of having a man to take the engineer's place in his absence is not so vital as formerly. In fact there is being installed a foot-operated master controller which will be worked by the roller, and cut out one man from the pulpit crew. With the motor the speed is practically constant, and there is no danger of overspeeding, even if the operator does not move his lever. The fatigue of the operator is also a factor, for the difference between pulling the engine lever and the electrical controller is quite marked.

Motor operated tilting, travelling roller tables serving 28" rail mill Algoma Steel Corporation


4000 h.p., 600 volt. d.c. motors and fly wheel motor generator set, driving 35 in. blooming mill, Algoma Steel Corporation

Many Advantages

With electric drive, the losses stop when the turn is over. At the opening of the switch the consumption of energy ceases. How different this is from the steam line, with its leaks always ready to start and condensation taking its toll of coal every second.

It it of great advantage to be able to place the mills in the best relation to other mills and yard facilities. With the electric drive this can readily be done, as transmission lines are not costly, and transmission losses are almost negligible in comparison with long steam lines.

Not nearly as much money tied up in spares and renewals with the motor. A large part of the electrical spares for the blooming mill are identical with parts for other electrical equipment in the plant. This condition allows the same spares to cover a lot of equipment, reducing the total amount invested in spare parts.

The electrical blooming mill combined with other main electric drives, gives an opportunity to use a large amount of powed, handled conveniently. Large amounts of power can be generated more economically by large units than by small. The steel mill has the choice of generating power at a low steam consumption by the use of large turbines, steam being produced by coal, waste heat boilers or blast furnace gas.

Material Heating

One of our photographs shows part of the ore handling equipment of the Algoma Steel Corporation, including ore bridges, ore distributing cars and furnace hanging ship hoists, all electrically operated.

In this as in other plants, ore bridges are extensively used to convey ore and stone from boat or trough to stock piles and bins. In the smaller plants a single unit is installed, hence reliability is important. Direct-current motors are almost always used for ore bridges and unloaders. Their principal points of advantage are as follows:—

(1) Accurate dynamic braking control can be obtained on the hoist motion with greatest simplicity.

(2) The motors required for hoist and trolley motions can be considerably lighter, due to the high starting torques developed by series motors. This feature has a material influence on the weight of the bridge structure.

(3) Direct-current magnetic control, in general, is superior to alternating-current control in flexibility and performance, is more compact and is lighter in weight.

(4) Fewer collectors are required.

Two general methods of hoist drive are in excessive use. The more common system utilizes one motor for the holding line and one motor for the closing line of the grab bucket, these being independently controlled. In the other system one motor is used. This motor drives the closing line drum through a clutch. The single motor arrangement operates very satisfactorily, also and has the advantage that full motor capacity is available for closing the bucket, if required.

Transfer cars and scale cars are to be found at most furnaces. Direct-current railway motors are best suited for these units, due largely to their mechanical adaptability. There are, however, a few successful alternating-current installations using wound-rotor motors. The ordinary induction motor is not very well suited for gearing to an axle under a car. The tendency is to gear these cars for too nigh speeds. Ordinarily the distances travelled are short and the service more or less of a spotting character.

Skip Hoists

As with the Algoma Steel Corporation, practically all the large plants are equipped with electric hoists, but in many of the smaller plants there is a tendency to prefer the steam hoists, which is lower in first cost and requires somewhat less floor space.

The great majority of skip hoists are operated by direct-current motors but there are a few alternating-current installations. The latter drive is similar to the single motor, geared direct-current hoists. The motor has two stator windings and two rotor windings, arranged for different numbers of poles to give two distinct running speeds. These speeds have a ratio of about 6 to 1, being respectively about 300 feet. and 50 feet per minute, Magnetic control is provided for reversing and cutting over the primary winding and for adjusting the secondary resistance. The travel is at the higher speed and slow down is obtained by transfer to the low speed winding,causing a negative torque momentarily. The control is by limit switch and the protective features are similar to those of the direct-current hoist.

Lighting of Steel Mills

Steel mill lighting presents a problem requiring special treatment in order to insure economical and efficient illumination. The first consideration is the quantity of light required. Tables which give the foot-candle values which experience has found desirable for the various operations and locations are supplied by many manufacturers. A range has been given in each case, as it is impossible to set a definite value owing to the influence of local requirements and surroundings upon the illumination necessary. Light colored walls, stationary objects or rough work may permit the use of the lower value. Dark surroundings, smoky, dusty atmospheric conditions rapidly moving machinery or prevalent accident hazards, however, call for the higher foot-candle illumination.

The Placing of Lighting Units

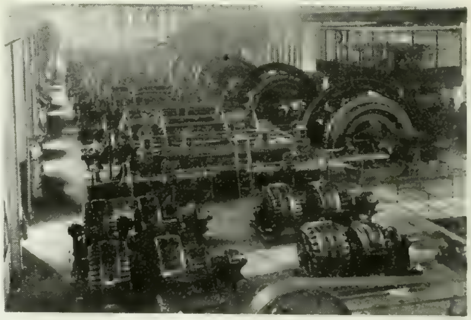
The location of outlets is naturally determined to a large extent by the proportions of the building, the size of bays and the ceiling height, bearing in mind that the position of the machinery is an important factor to consider in the placing of the outlets to insure the proper direction of light on the work.

In order to reduce the number of outlets to a minimum and to utilize the more efficient higher wattage lamps, the lighting fixtures should be mounted as high as possible. Customary practice is to mount the equipment either on the under side of the truss or to suspend the units on a level with the bottom of the trusses.

In long narrow buildings where the width is equal to or less than the height of the ceiling, one row of outlets down the centre ordinarily will prove satisfactory. If, however, machinery is located near the walls, two rows of units should be provided. In buildings where the width exceeds the height, the longitudinal rows should be so located that the distance between them does not exceed one and one-half times the distance of the light source to the floor. This same proportion applies to the outlets in each row, locating them if possible symmetrically with reference to the bays into which the trusses of the building naturally divide it.

Switchboard in blast furnace gas engine power house Algoma Steel Corporation

In buildings with extremely high ceilings, exceeding the width, the mounting of light sources on the trusses would result in a considerable portion of the light rays striking the upper section of the walls. With ordinary conditions of dark and dirty walls, the light reflection is so low that the resultant illumination is inefficient. In such cases angle reflectors, as shown in Fig. 2, mounted not less than twenty five feet high along each side wall, will provide an excellent installation. They should be spaced not farther apart than one and one-half times their height above the floor. With the overhead equipment, that may of necessity be above a crane, these angle reflectors mounted under the crane rails will supplement the general illumination, aiding especially that on the vertical surfaces.



Blast furnace gas engine power house at plant of Algoma Steel Corp.

Types of Reflectors

Direct lighting is, of course, the most economical for steel mill work, supplied by the larger lamps fitted preferably with porcelain enameled steel reflectors. These are more durable than the glass units although the latter may have a trifle higher initial efficiency. The enameled steel is not affected by moisture, ordinary atmospheric conditions, or acid fumes. It also has the advantage of being easily cleaned and will naturally withstand relatively rough service.

Electrified Mill is Cheaper

In itself the equipment and power cost of the electrified mills may not be lower than the same items for mechanical and steam operation, but when all production figures are considered the electrified mill is cheapest. The efficiency of the electrified system, the knowledge of production costs made possible by electrical operation, the flexibility of the installation and the possibility of adjustable speed control are great assets to the electrified mill. J. S. Unger, Carnegie Steel Company, declared that the steel industry would be completely electrified by 1950. The modern steel mill today is approximately 95 per cent electrified; while the industry as a whole is probably not more than 50 per cent electrified. It seems reasonable to predict that within the next ten years the percentage of electrification will increase to 75 per cent of the total. The trend of steel mill practice strongly proclaims that the electrical way is the best way.

Completion of the transmission line for the Dryden Paper Co., of Dryden, Ont., from their present paper plant to their new power plant at Wainwright Falls, a distance of about four miles, is announced. This development is to supply power to the new addition, and to the town.

The Heineman Co., of New York, have brought out a radio lightning arrestor which is approved of by the National Board of Fire Underwriters, under approval number 5872; they are available from all leading jobbers.

A Survey of Residence Lighting

Results of a Census of 1500 Middle-Class Homes—Detailed View of Conditions Obtained—Degree of Saturation of Wiring and Lighting Equipment

By A. M. LUCKIESH*

It does not require extensive observations to conclude that a large percentage of homes is inadequately and improperly illuminated and that the average householder is unconscious of many of the possibilities of modern lighting. That the public has not been convinced of the importance and possibilities of lighting is proved by the lighting conditions in the homes to-day. It is known in a general way that residence lighting is deficient and defective, but little is known of the details. To obtain detailed information of existing conditions a survey was planned.

The primary aim of the first part of the survey was to obtain detailed information of the average conditions in the middle-class homes. It is difficult to define the so-called "middle-class" but it has been assumed to be a group larger than the "low-class" and the "high-class" groups of homes. The data upon which this paper is based were obtained from analyses of detailed surveys of about 1,500 homes in a number of cities in various parts of the country. The form used was 8½ inches by 14 inches which was found to be a convenient size. Four questions were asked and following these was a description of the types of ceiling-fixtures designated by letters. This was followed by letters indicating the material which shades or envelops the light-sources. A ruled form provided horizontal rows of spaces for recording the data for each room. Vertical columns were provided for ceiling-fixtures, portable lamps, and wall-brackets and data requested for each of these classes of fixtures for each room. These data pertained to the number and type of fixtures, the material of shade, total number of sockets, and total wattage. A column was also provided for the number of convenience outlets in each room and one for floor dimensions.

The "Conservative Ideal" Average Middle-Class Home

The survey not only yields the details of wiring and of lighting but provides an average home as to size or number of rooms. This is made use of by designing conservative but adequate and proper wiring and lighting for this theoretical average home and ascertaining the difference between the actual conditions and those in the "conservative ideal" home. The average home may be wired and equipped in various ways and in the following paragraphs general descriptions and summaries are presented. These form a basis for computing the standings of various items considered in the survey. No detailed description of the fixtures and portables are presented for these are assumed to be equipped with proper shades, etc., to satisfy the requirements of good lighting.

Living-room

General lighting from a shower, or from "direct-indirect" portables, could utilize 200-watts. A table-lamp, a floor-lamp, a small piano or desk lamp, and two small decorative portables can account for 340 watts. This is a total of 540 watts all of which, of course, would seldom be used at one time. If decorative brackets were used the general lighting or decorative portables might be reduced accordingly. Three convenience outlets are specified.

Dining-room

In the case of a shower, lamps aggregating 150 to 200 watts in deep dense shades could provide general lighting and from 30 to 100 watts in decorative portables or brackets. A total of 230 watts is assumed to be desirable. One convenience outlet is specified.

Kitchen

A 100-watt lamp in the central fixture is assumed to be a desirable average. This would be a 150-watt if a "daylight" lamp is used. Two auxiliary brackets or other sockets would easily account for 80 watts. It appears safe to assume a total of 180 watts as desirable. One convenience outlet is specified

Bedroom

A central fixture using 50 watts, two brackets or dresser lamps using 50 watts, and a bed lamp of 40 watts makes an aggregate of 140 watts. This wattage may easily be distributed in two brackets and a portable without considering a ceiling-fixture. One convenience outlet is specified in each of three bedrooms.

Bathroom

One bracket on each side of the mirror and each containing a 50 watt lamp accounts for 100 watts. One convenience outlet is specified.

Basement

Assuming a 100-watt lamp or a 150 watt "daylight" lamp over the laundry trays and four other outlets distributed in locker, over work-bench, near heater, in coal bin, in toilet, etc., it is easy to account for a total of 300 watts.

Convenience outlets

A total of nine is assumed, thus providing an average of one per room with two extra for the living-room.

Portables

A total of eight is assumed; these include the small decorative portables.

Wall-brackets

A total of nine is assumed; these can easily be accounted for from a purely utilitarian standpoint without considering any decorative brackets in the living or dining-room. Two in each bedroom, two in the bathroom, and one in the kitchen account for nine.

Ceiling-fixtures

An average of one per room is quite, if not more than sufficient.

Total wattage

A total of 1,770 watts in these various rooms is assumed.

Material of Shades

The material which shades or envelopes the light-sources is designated in the survey as follows:

G—Glassware, S—Silk or other woven fabric, P—Parchment, M—Metal, N—No shade.

No questions were asked as to the characteristics of the glassware, that is, whether clear, frosted, highly diffusing, etc., because of the risk of making the survey-form too complex.

The percentage of the various materials in use for shading, reflecting, and diffusing are presented in Table I for the various classes of fixtures, in the various rooms. The horizontal rows of percentages should equal 100.

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*Before I.E.S., Swampscott, Mass.

Table I.—Materials in Use For Shading, Reflecting or Diffusing Light in the Middle-Class Home.

	Percentage				
	Glass	Silk	Parchment	Metal	None
Living-room					
Ceiling-fixtures	85	6	1	1	7
Wall-brackets	48	19	11	1	21
Portables	32	57	6	4	1
Dining-room					
Ceiling-fiixtures	88	3	1	1	7
Wall-brackets	56	13	8	—	23
Portables	44	38	11	4	3
Kitchen					
Ceiling-fixtures	76	—	—	3	21
Wall-brackets	60	1	—	1	38
Bed-rooms					
Ceiling-fixtures	89	1	—	—	10
Wall-brackets	77	10	1	—	12
Portables	35	46	8	10	1
Bath-room					
Ceiling fixtures	80	—	—	1	19
Wall-brackets	85	—	—	1	14
Totals					
Basement sockets	10	—	—	3	87
Ceiling-fixtures	85	2	—	1	12
Wall-brackets	73	7	3	—	17
Portables	34	52	7	6	1

It will be noted that 12 per cent of the ceiling-fixtures and 17 per cent of the wall-brackets have no shades. The candelabra and other fixtures designed for round-bulb lamps are responsible for much of these percentages. There is missionary work to be done in equipping these "round-bulb" fixtures with shades. There are holders available now for these fixtures which do not have holders attached. Some of these holders are held in place by screwing the lamp into the socket thus making it possible for anyone to equip these fixtures with shades. The basement is also open for missionary work, especially in the case of sufficient and proper lighting for the laundry trays.

There is an appreciable percentage of all fixtures in all rooms not equipped with shades. Glass is the predominant material excepting in the case of portables. Here silk predominates.

Fixtures

There is more or less confusion and indefiniteness in the use of names of fixtures. For the purpose of the survey it was necessary to adopt simple definitions but not too many of them. The definitions used on the survey-form are presented herewith.

The lighting equipment is divided into three classes of fixtures, namely ceiling-fixtures, wall-brackets, and portables. These are then subdivided into types such as shower, etc.

The ceiling-fixtures are designated in the survey-form by their initials and are defined as follows:

B—Bowl—A fixture consisting of a bowl usually open at the top and hung from the ceiling.

S—Shower—A fixture, suspended from the ceiling, in which a number of incandescent lamps are hung in a downward position.

BS—Bowl-Shower—A bowl and a shower combined in a single fixture.

C—Candelabra—A fixture suspended from the ceiling in which a number of incandescent lamps are mounted in an upright position on "imitation" candles.

DC—Drop-cord—A fixture consisting usually of cord suspended from the ceiling with one socket attached.

R—Rosette—A fixture consisting of a plate attached to the ceiling on which is mounted one or more collars or rosettes each containing a socket.

BL—Ball—A fixture of totally enclosing glass or other material, regardless of shape, which is hung at the ceiling.

D—Dome—A fixture consisting of a large shade, suspended from the ceiling, with a wide opening at the bottom which emits light downward. This unit is the reverse of a bowl.

The percentages of various types of ceiling-fixtures found in the various rooms of the urban middle-class home are presented in Table II. There data show the tendencies of the past. We know from dealers' stocks what the present tendencies are.

Table II.—Various Types of Ceiling-Fixtures in the Various Rooms of the Middle-Class Home.

	Percentages				
Classification	Living-room	Dining-room	Kitchen	Bed-room	Bath
Bowl	16	21	3	10	4
Shower	58	42	6	23	3
Bowl-shower	11	12	—	—	—
Candelabra	3	7		-	
Drop-cord	3	4	71	46	63
Rosette	7	4	10	15	18
Ball	1	1	3	5	11
Dome	1	9	7	1	1
	100	100	100	100	100

The average number of ceiling-fixtures, the average number of sockets per fixture, and the average watts per socket, for the various rooms are presented in Table III.

Table III.—Ceiling-Fixtures in the MiddleClass Home

Type of Room	Fixtures per room	Sockets per fixture	Watts per socket
Living-room	1.0	2.8	41
Dining-room	1.0	3.4	40
Kitchen	1.1	1.1	59
Bed-room	0.8	1.3	43
Bath-room	0.5	1.0	51
Average	0.88	1.92	47

The average number of ceiling-fixtures per home is 5.4.

It is seen that there is an average of nearly one ceiling-fixture per room. This is as many as necessary for satisfactory lighting. Many of these are antiquated and should be replaced by modern fixtures but the rehabilitation of these old fixtures can be accomplished in many cases by installing new shades. It is interesting to note the predominance of the multi-socket fixture in living and dining-rooms. The dome, if well designed, is one of the best fixtures for illuminating the dining-table, still it is used in only nine per cent of the dining-rooms. In some other rooms a type of fixture is used which was classified as a dome.

Wall-Brackets

There are many excellent uses for wall-brackets such as flanking mirrors in bedrooms and bathrooms. Brackets are also useful in the kitchen. Data pertaining to brackets are presented in Table IV from which it is seen that there is an average of only 0.37 bracket per room and only 2.6 brackets per home. Wall-brackets are not sufficiently used in bedrooms, bathrooms, and kitchens to meet the requirements of adequate and proper lighting. Allowing nine wall-brackets in the "conservative ideal" average home it is seen that this item is 29 per cent of saturation.

Table IV.—Wall-Brackets in the Various Rooms of the Middle-Class Home.

Type of room	Fixtures per room	Sockets per fixture	Watts per socket
Living-room	0.40	1.2	34
Dining-room	0.21	1.3	31
Kitchen	0.17	1.0	35
Bed-room	0.45	1.1	40
Bath-room	0.63	1.0	45
Average	0.37	1.12	37

Portable Lamps

The portable lamp has many advantages in residence lighting as well as many applications. If properly designed for each purpose it can go far toward solving most of the lighting problems in the home. Its decorative value and its portability are pre-eminent characteristics. It represents the best solution of lighting problems for the renter in many cases. Of course it requires a convenience outlet and these are far too rare. However, it is relatively easy to install convenience outlets and the cost of a convenience outlet is less than that of a fixture. The landlord should be more easily persuaded to supply such outlets in the inadequately wired and illuminated apartment than to add more fixtures. Furthermore a single convenience outlet can be made a distribution centre for several portables. From every angle the portable lamp has many advantages and it appears that its present popularity will greatly increase. In fact if the manufacturer would supply portable lamps and portable brackets each properly designed for a definite lighting purpose, residence wiring and lighting could be solved largely by convenience outlets and portables respectively. In Table V data pertaining to portable lamps are presented.

Table V.—Portable Lamps in the Middle-Class Home.

Type of room	Portable per room	Sockets per portable	Watts per socket
Living-room	0.95	1.7	42
Dining-room	0.12	1.4	37
Bed-room	0.14	1.1	40
	———	—	—
Average	0.40	1.4	40

An average of 1.6 portables per home is found in the middle-class home. In the "conservative ideal" average home eight portables including the small decorative ones, have been provided. This indicates 20 per cent saturation.

Convenience Outlets

One of the most deplorable phases of the wiring of homes is the paucity of convenience outlets. When it is considered that, besides providing for the use of portables, convenience outlets extend their usefulness to the many electric appliances, it appears that there should be at least one in each room and at least two or three in the living-room. In the "modern electric homes" of average size as many as forty such outlets have been provided. In the "conservative ideal" average home nine convenience outlets have been allowed. The survey of the middle-class home reveals an average of 2.5 convenience outlets, therefore in terms of the "conservative ideal" this item is only 28 per cent of saturation.

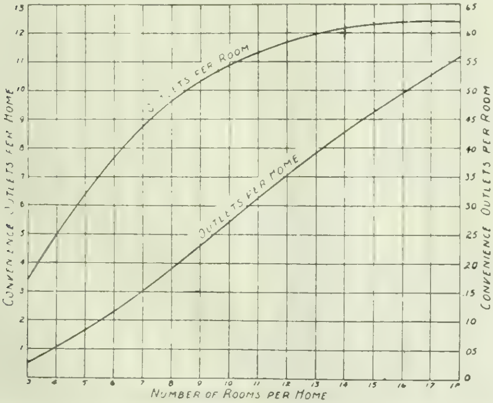


Fig. 4—The influence of size of home on number of convenience outlets

In Figure 4 are shown the average number of convenience outlets per home and per room for homes of various sizes.

It is seen that the number of convenience outlets increases directly with the size but the number per room reaches a fairly steady value for sizes greater than the average home. Of the total number of convenience outlets; 71 per cent were found in homes having from six to nine rooms, and 83 per cent in homes having from five to ten rooms. Of course this is largely due to the fact that most of the homes are found to be within these ranges.

Wattage

The average watts per socket is in general fairly satisfactory. These are shown in Tables III, IV, and V. The wattage in certain sockets such as in the kitchen, should be considerably increased. With the exception of the purely decorative brackets and portables the watts per socket should be somewhat increased to secure adequate lighting with proper diffusing shades, etc. But the total wattage of the average home falls far short of the total in the so-called "conservative ideal" average home. This is chiefly due to the inadequate number of sockets in the average home to provide convenient, adequate and proper lighting.

In Figure 5 are presented the average total wattage per home and per room for homes of various sizes.

The average total wattage of lamps per home found in the middle-class homes is 863 watts, including hallways, etc. This is an average of all sizes of homes surveyed.

The average total wattage of lamps per home found in the rooms and basement, exclusive of hallways, etc., is 734 watts. This is an average of all sizes of homes surveyed.

The total wattage allowed in the rooms and basement of the "conservative ideal" seven-room house is 1,770 watts. From the data obtained it is found that the average total wattage per home, corrected to a seven-room house in order to be comparable with the wattage of the "conservative ideal," is 812 watts. Therefore by dividing 812 by 1,770 it is found that the average wattage per home is 46 per cent of that required for adequate and proper lighting as represented in the "conservative ideal" home.

This does not mean a similar increase in the consumption of energy for lighting. It is estimated that the energy consumption for lighting would be increased from 50 to 100 per cent if wiring and lighting equipment were brought up to the standard used in these computations.

The average total wattages in various rooms compared with the wattages allowed in the "conservative ideal" are presented in Table VI.

Table VI.—Average Total Wattage in Various Rooms Compared With Desirable Total Wattage.

Type of room	Actual wattage	Desirable wattage
Living-room	234	540
Dining-room	150	230
Kitchen	76	180
Bed-room	67	140
Bath-room	57	100
Basement	94	300

Number of Sockets Per Home

From such data as already presented it has been found that the average total number of sockets represented in the six rooms including living-room, dining-room, kitchen, bedroom, bathroom, and basement is seventeen. Adding to this two more bedrooms and we have twenty sockets exclusive of halls, porches, etc. Allowing four sockets for the other places we have a total of twenty-four sockets in the average middle-class home.

Per Cent Saturation

Assuming that the survey has shown the average conditions of wiring and lighting in the middle-class home it is possible by using the values of the various items of wiring and lighting equipment in the "conservative ideal" home to compute the status of the various items or the per cent saturation. That the data represents the average conditions in the middle-class home sufficiently closely for the present purpose is indicated by the inappreciable differences in the values of the various items in a summary of 800 homes as compared with a summary of the second similar group. Furthermore the survey has been conducted in about twenty cities throughout the country. Data on a few homes were obtained in many other places. Furthermore it appears that the lower-class home is even less adequately wired and lighted than the middle-class home. Therefore the percentages of saturation presented in Table VII should be conservative when applied to the eight million wired homes.

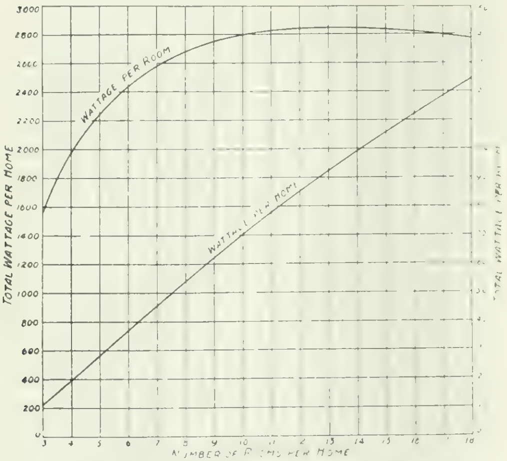


Fig. 5—The influence of size of home on wattage

Table VII.—Percentage of Complete Saturation of Various Phases of the Average Middle-Class Wired Home.

Items	Per cent
Total wattage of lamps	46
Convenience outlets	28
Portable lamps	20
Wall brackets	29
Ceiling-fixtures	100

Conclusions

Inasmuch as conclusions readily can be drawn from the data only a few will be pointed out here.

The most popular rented middle-class home has about six rooms. The most popular middle-class home occupied by the owner has about seven rooms. More than 80 per cent of the homes having six or less rooms are rented. More than 80 per cent of the homes having more than seven rooms are occupied by the owner. There is a very marked transition from predominantly rented to predominantly occupied by the owner in passing from the six-room to the seven-room house. The number of "rented" homes approximately equals the number of "owned" homes.

Glass predominates among the shades and diffusing media used on fixtures. Silk predominates on portables. Parchment is used only to a relatively small extent.

From 7 to 21 per cent of the ceiling-fixtures in various rooms of the middle-class home do not have shades. From 12 to 38 per cent of the wall-brackets in various rooms have no shades.

The use of ceiling-fixtures is as extensive as can be justified.

Wall-brackets are much less plentiful than they should be. An increase of 250 per cent in the number of utilitarian wall-brackets appears justifiable.

Considering their advantages the use of portable lamps is much less than it should be. An increase of 400 per cent appears justifiable.

The well-known scarcity of convenience outlets is verified. An increase of 250 per cent is justifiable.

The average total wattage per home is less than half what it should be to provide adequate and proper lighting. The average watts per socket is fairly satisfactory although it could be increased somewhat with justification. The sockets in the portables and wall-brackets which should be added to the average home in order to secure desirable lighting represent the desired increase in wattage to a large extent.

The average total watts and the average number of convenience outlets per home increases almost directly with the total number of rooms. This is true for the average watts per room and average number of convenience outlets per room for the smaller homes but these items appear to approach a constant value for the larger homes.

The wiring and lighting equipment in the rented home is marked by inferiority to that in the home occupied by the owner.

There is an average of about 24 sockets in the middle-class homes. The wiring and lighting equipment of the low-class home is very much inferior to that of the middle-class home. The deficiency is particularly marked by a nearly total absence of convenience outlets, portables, and wall-brackets, and by the large percentage of unshaded lamps. From 26 to 56 per cent of the fixtures, exclusive of the basement, were found to have no shades.

From the standpoint of an adequately and properly wired and equipped average middle-class home the average wired home to-day might be said to be less than "half lighted."

In this paper summaries of pertinent data yielded by the survey thus far have been presented. Data pertaining to many other phases are already available and other angles are being investigated. The survey is still in progress and will likely be continued for some time.

The author acknowledges his indebtedness to Mrs. H. O. Fullerton, Mr. H. H. Kirby, and Mr. H. A. Fellows for analyzing the survey-forms and to many who kindly assisted in distributing and in collecting the forms. Among the latter he wishes particularly to thank the departments at Nela Park, various factory-managers of the National Lamp Works, Mr. G. B. Regar, Mr. C. M. Masson, Mr. C. H. Ferris of the Illuminating Glassware Guild, and Mr. J. E. North of the Cleveland Electrical League.

Reg. Smith Sales Manager

J. A. Gibson, has just been appointed western manager of the Benjamin Electric Company in succession to Mr. Reg. Smith who has been appointed sales manager of the company at Toronto. Mr. Gibson has been working on the city sales in Toronto for some time for the same company. Previous to this he spent two years with the Northern Electric Co. at Toronto, and was also connected with the Westinghouse Electric & Manufacturing Co., in the western states. Mr. Gibson has a good knowledge of western conditions, as he was born and educated at Morden, Manitoba, and has travelled the Manitoba and Saskatchewan territory for five years. The western office of the Benjamin Electric Co. is located in the Confederation Life Block, Winnipeg.

BETTER MERCHANDISING

A Page From a Wiring Salesman's Diary

Only One Way to Get Business—Go-Get-It! The Consumers are all Set and Ready but—If You Want Fruit You Must Pick It Yourself

Houses are being built by thousands. Every one is a home and 100 per cent of the people that live in them want all possible conveniences.

Why then, in the face of this, is the average percentage of expenditure for electrical work so low?

Why are electrical contractors although they may be as busy as bees, making no more, often, than a living wage?

There is no one reason—but there is one big reason. That is, house builders are not being sold on electrical work. The average contractor gets only the business he is exposed to. If a man runs along with his mouth open he will catch a few flies, but if he uses his brains and a swatter, he will get bagsfull.

The following article has been lifted bodily from the notebook of a wiring salesman. It tells of actual experiences—the real-life efforts of an earnest salesman, who is thoroughly sold himself on better wiring. There is something to be learned from it—read, and inwardly digest!

Remember, these notes are, absolutely, written from actual experience.

No. 1. Was Very Abrupt

No. 1. Very abrupt. I visited the owner of a $30,000 duplex house under construction with a view to selling him electrical appliances, more particularly ranges. He told me that as there was gas on the street, he was not in the market to buy. I then asked him what disposition he hoped to make of this house when completed, and he told me that he expected to live in the lower apartment and rent the upper for the modest rental of $150 per month. I then suggested to him the possibility of his prospective tenant wishing to cook electrically, and asked him how he would meet such a situation, and he replied, that of course he would have to give them service to do so. I then pointed out to him that it would be a great deal more economical to have this service installed when the house was being wired in the first instance. I interested him still further by telling him of the many advantages and comforts to be derived from electric cooking, and he finally consented to ask his wiring contractor what this extra service as outlined above, would cost. He evidently made the enquiry, and found that he was going to be well repaid on his investment, for he had a three 00 wire service installed and afterwards purchased two electrical ranges and two water heaters.

Contract Already Let

No. 2.—A private residence, costing $30,000, under erection. Walls up when I visited the house, gas on the street. I called the owner of this house on the telephone and asked him if he would be interested in getting prices on electrical equipment for his new home, to which he replied that he had not though of doing so.. I asked him if his wiring contract had been let and he said, yes; and I further found out that there was no provision being made for the use of heavier appliances. The next day I got in touch with him personally, and pointed out to him that even if he were going to use gas at the moment, he would be well advised and save money to have a heavy service installed. The final result was that in a few days he called me up and told me he had decided to install an electric stove, water heater and grate. Together we visited the house, went through it and decided on several convenience outlets, which would not have been put in had the original wiring plans been followed out. I was in this house a short time ago, and it a forded me great personal satisfaction to think that my feeble efforts had been rewarded in such a very gratifying way. I did not even inquire for the name of the man who did the wiring in this house; but the thought will naturally come home to you, that if this wiring contractor had gone about the matter properly in the first instance, all this re-consideration and re-adjustment would have been quite unnecessary.

The Real Estate Man

No. 3.—Real estate firm building houses in various parts of the city, replied to my inquiries re the wiring in their houses under construction, that in their better houses, selling for $10,000 and upwards, they were installing power service, but in the cheaper houses they did not feel that they were repaid for the extra money expended in installing such power service. They pointed out to me that the buyers of houses worth $10,000 or more are more discriminating and better informed, and therefore, insist on having the most modern facilities for the operations and use of electrical appliances in these homes; whereas the buyers of the cheaper houses are not so particular, and will not pay any more for a house that is modernly wired than for one wired for an ordinary lighting service only. Further, to this I added every argument and reason I know of to convince them, that they would possibly be censured later on by the buyers of these homes for not having had them properly wired, but they simply said that "they should worry," as long as they got them off their hands at the price they hoped to get for them. In houses of this class they were following the lines of least resistance; or in other words, giving their clients less than was really necessary in electric wiring.

A Conservative Type

No. 4.—A private residence for $30,000. I approached the owner of this house as soon as I found out it was well under way, and would be almost ready for wiring. I found him to be an old conservative type of man, and not very kindly disposed to innovations of any kind. I, however, interested him considerably by telling him what wonderful satisfaction hundreds of people in Toronto are enjoying through doing their cooking and water heating electrically; and it finally came to a matter of cost of installation, which I advised him to take up with the man who is going to do his wiring. He finally did as I suggested and I am very glad to relate that very largely due to the co-operation I received from the wiring contractor, this house, although not occupied yet, is equipped with three No. 0 wires in the standpipe, 100 amp. main switch, and convenience outlets well distributed throughout the house.

Didn't Know Anything About It

No. 5.—A prominent real estate agent and building operator has under construction at the present time some thirty or thirty-five houses. When I first approached this man, he told me that he had already decided to install gas, for the one and only reason, namely, it was cheaper than electricity. Like hundreds of others I gathered from his remarks that he hadn't the slightest idea about the costs of cooking or heating water electrically. He had not even gone so far in asking for his wiring tenders as to see that they would include service for anything heavier than ordinary light; but after pointing out to him that his houses, if properly wired, would be more desirable in the eyes of people who have been giving these matters some thought, that in selling them he can point to them with a good deal of pride and say that for the price, they were the most modern block of houses in the city, he re-considered his original decision and now all of his houses are being equipped with three No. 4 wire services. And I might just here mention that he has introduced a novel idea in Toronto, and that is, the one of installing the stove and selling the house already equipped for cooking.

He Cabled For Wiring

No. 6.—Builder and contractor, building an apartment house, nineteen suites. This man at first would not consider wiring an apartment house for electrical cooking, but after drawing his attention to the fact that apartments fitted with electrical cooking equipment would not require the constant redecoration and paintings from year to year that they would require if gas were being used, together with the fact that they would be thoroughly modern, more sanitary to live in—because electrical cooking does not absorb the oxygen in any way, and of course everyone knows that in the case of the gas stove, it takes oxygen to feed the flame. Another argument that possibly gained favor with him was that the kitchens of these apartments would be comparatively as cool in the summer as at any other time of the year on account of the fact that electric stove ovens are thoroughly insulated, and therefore, do not radiate much heat into the room in which they are being used. The result of this effort, I am glad to say, was, that he called for new wiring tenders on the building and is equipping this splendid apartment house throughout with electrical cooking stoves.

So in view of the above experiences, it would seem to me that if electrical wiring contractors were thoroughly sold on real good wiring themselves, and could point out the advantages of such to the speculative builder, the prospective purchaser or tenant, or to the man who is building a home for himself, very few houses that are under construction at the present time would be completed without at least three No. 4 wires in the standpipe. Unfortunately, the tendency seems to be to give a man a cheap installation. Anything cheap, if unsatisfactory, is expensive; so, the better installation a man can be induced to put in his home, the better satisfied he will be for the rest of his life.

"The Very Thing For My Wife!"

John Dealer Tells How He Sells Electrical Appliances—Especially Washing Machines. "Nails" the Hardware Man, Got His "Goat"—Then He Wakened up.

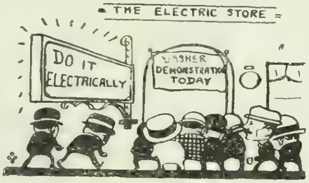
A representative of the "Electrical News" interviewed a successful electrical dealer the other day to find out from him why he was so successful in selling electric washers.

The retailer's name would be recognized by many if we printed it here, but he is a modest man (notwithstanding his merchandising ability) and he said plainly that he would not give out any ideas for publication under his own name. So we conciliated him by promising to keep it dark and for the purpose of this article we will call him John Dealer.

You Can't Mistake This Store

John Dealer's store is located in one of the business streets that develop in suburban areas, in a medium sized Canadian city. "Electrical News" located the street easily enough and didn't have to search for the number at all. John Dealer had a sign out that no one could mistake, and besides that, there was an electric heater on a stand in the door-way sending forth its rays of welcome into the chill November air. No-one could pass by without recognizing that store as one where electrical appliances were sold.

There was a brisk air about the whole place. The "Electrical News" man was picked up right away, as he paused in the front part of the store, by a cheerful looking clerk who wished him "Good day" in a way that implied he was there to attend to the customer's wants with all the goodwill in the world. He said that the "boss" was in the back store and the writer travelled back past an array of washers, ironers and other appliances, to be greeted with a hearty handshake from John Dealer himself.



Goid Morning, Mr. Dealer! How About Electric Washers.

"Good morning. Mr. Dealer. I phoned you yesterday about your washing machine campaign. Have you got time to give me a few particulars now?

"You're bright and early all right" replied John Dealer. "No trouble to give you all the details you want. Sit down, and tell me what you want to know first?"

"Suppose you tell me why you started the campaign and then how you opened it and the details of its progress."

"Well, in the first place you remember how I used to keep a washer in the corner there. I sold a few, mainly to customers with whom I had a good connection in other ways. There wasn't much money tied up in that end of the business and to tell you the truth I was pretty well satisfied with things as they were. But then Nails, the hardware man down the street, started something. Somebody unloaded a bunch of electric washers on him and he started in to push them. It got my goat to walk past his place and see the signs up.—ELECTRIC washers and ELECTRIC irons, ELECTRIC everything everywhere you looked. And besides, Nails doesn't know the first thing about electricity. I know for a fact that he sold one of those washers and something went wrong with it. Generally he doesn't service machines but this time it was Mrs. Rocks, so he sent up his delivery man to fix it. He fixed it all right. The washerwoman stuck her hands in the water and then threw a fit because this delivery man had grounded the motor feed on the frame somehow and she got a nasty jolt.

They Talked About Electric Washers at the Tea Meeting

"But I'm getting off the track. As I was saying, Nails pushed these washers and I didn't like it, of course. Then my wife said something about how she was out at some tea meeting or other and a woman there got talking about electric washers and said how Mr. Nails had sold her such a nice machine. That woke me up, alright. I saw right then that he was getting a lot of free advertising and that besides washers he would be cutting right into the rest of my appliance business.

I CAN READ THE PAPER NOW THAT I HAVE A WASHER

"What did I do? Well, I thought over it for a while, then I wrote to the manufacturers and said that I would like their assistance in pushing washers. A letter came back by the next mail, and they assured me of their co-operation.

The Power of Contact

"No use troubling you with the details of my arrangement with them. As you can see we got in a live window demonstration. You can't beat a moving display. Look at it now. Did you ever see the old lady working?" and he touched a switch and the automatic window display began to work. It represented the old way and the new way of washing and it was amazing to see the number of passers-by who stopped to take in the lesson of the unkempt figure at the old style washboard contracted with the dainty lady of the house and her shining electric washer.

"That is only part of it, though" said John Dealer. "I spent a little money on advertising too, but the main point was my prospect list. The manufacturers of this machine put me up to that and I got after it in dead earnest. I got every available name.

"Of course I couldn't spare time to do all the canvassing myself. And I must admit I don't care an awful lot for this house-to-house business. What I did do was to advertise for honest-to-goodness canvessers, promising them fairly liberal terms. When they came in I sized them up pretty carefully, I can tell you. I am getting off my story again, but I can tell you to get a good house-to-house canvasser is a pretty stiff proposition. The peddler type is the easiest kind to get, and of course they do you more damage than they are worth. The trouble seems to be that good men have steady jobs—I believe I interviewed a couple of dozen before I got three I thought looked dependable. They have to do a lot of unpleasant work, I believe some of the best of them have to stick their foot in the door occasionally until they gain an audience.

Canvassers Working on Fair Commission

"Well, I got three canvassers; they all had had some experience and the company furnished one of their salesmen to give them a little preliminary drill. So far the campaign had not cost me much, and I made up my mind it had to pay its own way. All the help furnished by the company came gratis, fortunately. The canvassers were to work on commission, and I made that liberal enough.

"By this time I had got so enthusiastic I had forgotten about Nails and the number of machines he was selling. And to tell you the truth, I find the more you work the less you worry about competition.

"There was one more detail that I arranged before the campaign started. I couldn't afford to tie up any more money in stock and it seemed as clear as daylight that if I got a large number of machines off my hands I would be loaded up with paper from the installment plan. It looked like letting easy money go, but I cleared decks right away by arranging for someone else to carry this paper. And in my opinion that's the only way for the small dealer to take care of the installment plan proposition. He can't afford to tie up thousands of dollars in machines not paid for. The charges made by these companies that carry the paper are not unreasonable, either."

"I Felt Encouraged to Run More Advertising"

"Well, with that detail settled, the stage was set, so to speak, and I will tell you what happened. The first thing was that results did not come in right away. It took 3 days for the faithful canvassers to sell a machine. I lay that to sort of getting the bearings loosened up. But, after that, results began to come in and I felt encouraged to run a little more advertising. I got a quarter page and ran it steady, using the washer company's cuts and their copy, pretty much.

MAKE IT AN ELECTRICAL XMAS AND BUY ELECTRIC GOODS HERE

"I guess that's when you began to take notice, wasn't it? Those ads. drew a lot of attention, I know, and the result was all the other birds began to push washers. Now you will think it funny, but that has actually helped business. With everybody boosting electric washing machines and showing how foolish it is to stick to the old rub-board, the public gets talking about it, and they begin to understand that it is the only way to wash clothes. I tell you the only reason people don't come in and buy electric washing machines as a matter of course, is because they are not educated up to using them. Once get them talking about them and they begin to see their value.

Bath Tubs and Electric Washers

"It is like bath tubs, you know. Remember when a hotel room with private bath was an unheard-of luxury—that was only around 1880. Now you think yourself hard used if you can't get one. It will be the same way with electric washers. I am firmly convinced that in a few years an electric washing machine will be considered a necessity in every home.

ALL THIS FREE SOAP WITH EVERY WASHE

" I have found out a whole lot of other things about the washing machine business since I started this campaign. One that sticks in my mind bears out the truth of the old saying "Vanity, thy name is woman." Do you know that once a woman gets a machine, her neighbors are the best possible prospects? It is the old case of keeping up with the Jones's. If Mrs. Jones has a machine and gets satisfaction from it, she naturally talks about it. I don't say that it is done in every case with the desire of exciting the envy of her neighbors—they often do it unconsciously—but it produces the same effect. Yes, sir, if Mrs. Jones has an electric machine, and you live on the same street you are out of it, if you haven't got one too.

Worse Than Pulling Teeth to Get Machine Back

"Another point is, that once you get a machine into a house, it is like pulling teeth for them to let it go back again. The machine is there doing the work and naturally the woman doesn't want to go back to the misery of the wash-tub. Besides that, it takes two men and a truck to move a washer and involves a lot of publicity. Everybody on the street knows that Mrs. Jones is having her washer taken out, and the natural assumption is that they can't pay for it. So 9 times out of 10 if you get a washer into a house, it is sold. The trick is to get them to take the washers into their houses. That is only done by honest salesmen who really believe in electric washing machines themselves.

High-power Salesmanship a Mistake

"That reminds me of another point. In my opinion this high flown type of salesmanship is all wrong when applied to selling electric washing machines to a woman. Theoretically the super-salesman comes along and hypnotizes his prospect into signing on the dotted line at the psychological moment, and everybody is happy ever after. Actually, you can make sales that way, but they don't stick. I have found that ordinary common-sense plus courtesy form the most effective combination for making washing machine sales, and gets you satisfied customers who don't hound you to take the machine back. None of this tricky stuff for me.

"I am satisfied with the results I have got out of the extra effort put into this sale. I admit I was a bit dubious at first, but now you can see for yourself how well it has caught on. I am going to do the same thing every year, too. Now, you can go ahead and make an article out of it for the benefit of others. There is one more thing—tell them to stick to one type of machine. Too many irons in the fire put the fire out. If I was bothered with too many lines I couldn't do all of them justice.

"Goodbye, send me an extra copy with the article in it."

Electrical Enterprise in Old Quebec

Public Interest Receives Real Impulse From a Two Weeks' Demonstration of Westinghouse Cooking Appliances and a Highly Successful Electrical Luncheon Attended by a Record Gathering of Rotarians—Mechanics Supply Company's Commendable Enterprise—Practical Addresses and Interesting Reminiscences.

The merchandising of electrical cooking appliances received a timely and gratifying impetus in Quebec City during the last two weeks of October, when daily demonstrations were given at the commodious headquarters of the Mechanics Supply Company, Limited the local distributors for the Westinghouse firm.

This was the first exhibition of the kind ever given in the old Capital, and the novel and practical operations were productive of ample evidence of a lively interest on the part of the public. The demonstrations were in the competent hands of Mrs. M. J. Sheppard and Miss M. E. Henderson, the former in charge of sales, and the latter as demonstrater

The culminating point of the demonstration was reached on Wednesday, October 25th, the occasion being an electrical luncheon tendered to the Quebec Rotary Club by the Mechanics Supply Company, Limited. This function was unique in the annals of the Club in that its meetings are held regularly at the Chateau Frontenac, and that a record attendance was made on the occasion of this departure from that practice, no less than seventy-eight per cent of the membership being present.

Such is the magnetism exerted by an electrical luncheon —even in old Quebec!

The luncheon was given in one of the company's large show rooms, and the food was prepared on Westinghouse electric ranges within view of the guests.

Nearly one hundred local business men, the majority of them drawn from various circles of important industrial enterprise, sat down to an excellent meal.

The original Office and Showrooms of the Mechanics Supply Company, Limited, on St Peter Street, Quebec. These premises were opened in 1889 and the photograph was taken two years later. The president and vice-president of the firm to-day are shown in the picture—both in the front row, on the right of the doorway, the president, Mr. W. H. Wiggs, and on the left, the vice-president and general manager, Mr. G. H. Simpson. In the rear on the right we have Mr. Omer Carrier, still in the firm's employ as head storeman.

The menu card itself was an example of ingenuity. The frontispiece showed the following alluring picture calculated to advance the interests of the dealer in electrical cooking equipment

The Westinghouse

The inside of the menu card contained, in the following lines, indisputable evidence of the versatility of the electrical mind. They were penned by Geo. A. Clare, of the Mechanics Supply Company:

"A Rotarian gay, was worried one day
As he looked at his wife in a dazed sort of way;
The careworn expression he'd longed to efface,
Had vanished by magic, and left not a trace.
So bright and so sweet! Why he jumped with 'de-light'
Yet somehow or other he could'nt guess right
There's a reason of course for the wonderful change
She's lately been using a Westinghouse Range."

The menu itself, which set forth the items of an excellent repast, seemed to lend additional motive to the Rotarian songs which followed. Here it is:

Vacuum Fillers

Entrance Switch
Celery and Olives

Condulet Soup
Boiled in 8½ Minutes

Cut-Outs-Cold
Ham and Beef

Multiple Battery
Salad

Relay
Apple Pie and Cheese

Perculator Connection
Coffee

The "King"-having been duly honored, the chairman, Mr. W. MacMillan, paid a tribute to the hospitality of Mr. W. H. Wiggs, president of the Mechanics Supply Company, Limited, who received a warm ovation upon rising to reply.

Mr. Wiggs confined his remarks mainly to an appreciation of the Rotary Club's very practical efforts in creating and developing a civic spirit in Old Quebec. He also rendered tribute to the electrical industry by a tactful reference to the means by which the luncheon had been prepared.

Mr. G. H. Simpson, vice-president and general manager of the Mechanics Supply Company, speaking in French, thanked the Rotary Club for the compliment they had paid their hosts in turning out almost to a man to keep abreast of the spirit of electrical enterprise.

The History, Development and Progress of Electrical Cooking Equipment

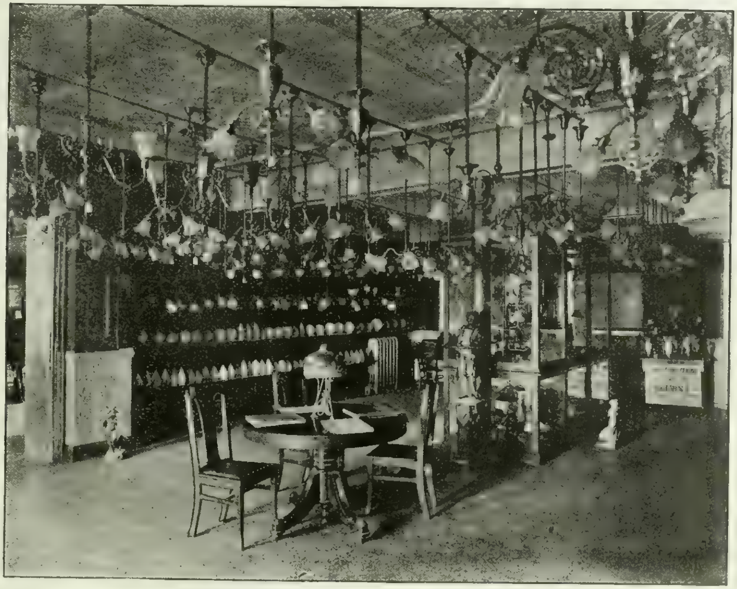
A particularly interesting address was given by Rotarian Ralph B. McDunnough, general superintendent of the Public Service Corporation of Quebec, who dealt with the history, development, and progress, as well as with the economical and general advantages of electrical equipment, laying particular stress upon the subject of increased cooking efficiency.

Headquarters Mechanics Supply Co. Ltd., Quebec City

Headquarters of the Mechanics Supply Company, Quebec City—The Ceremony of laying the Corner-Stone of the present building in 1913

Mr. McDunnough said in part: "It is rather apropos that I should be the speaker at this electrically-cooked luncheon, as I am one of the pioneers in electrical cooking in the Province of Quebec.

"I have been married some fifteen years and have never used anything but electricity for cooking. In those early days of the art, we did not have a complete range such as is available today. We had separate appliances for each purpose,—all assembled in a cabinet for convenience. I still



Electrical Display Room, Mechanics Supply Co. Ltd., Quebec have some of the original articles at home. Now I have a complete range.

"The first practical attempts at electrical cooking go back to 1890 in England. In 1891, there was an exhibit of electrical cooking appliances at the Crystal Palace. In 1895 an electrically-cooked banquet was served at the Cannon Street Hotel in London. The Lord Mayor was present at the function. This banquet was a great success—not only in regard to the cooking, but also in arousing public interest in the subjcet.

"The idea was first taken up in the United States about 1900, but little progress was made until 1905, when three manufacturers started making cooking appliances. From then on the progress was rapid, and in 1909 the electrical range came out practically in the form of today, although in cruder design and lacking in many improvements now available.

"It is safe to say that no progress would have been made had it not been for the development of nichrome wire. Nichrome wire has about sixty times the resistance of copper, while German silver has twenty times, and good steel wire eight times that resistance. Nichrome wire does not oxidize or deteriorate under ordinary temperatures, and has a melting point of 2,500 F.

"Fuel heat is produced by a gaseous, vitiating soot-producing flame, which is the result of combustion with the oxygen of the atmosphere. Electric heat is produced by a current flowing through a wire of high resistance, which does not affect, nor is it affected by, the atmosphere. Electric heat is different from fuel heat, as it may be concentrated at the point of application in any quantity and with a uniform intensity. It is produced without combustion, flame, soot or fumes, may be confined to any area, and is under absolute control.

"Heat is imparted in three ways familiar to us all—radiation, conduction and convection. The burners of an electric range impart their heat by a combination of conduction and radiation.

"Heat is measured in British thermal units. A B.t.u. is the amount of heat required to raise one lb. of water one degree Fahrenheit. If you consider a dollar's worth of electricity as compared with coal, oil, gas or wood, you will have less B.t.u's. for your money,—but, owing to the efficiency with which these B.t.u.'s may be applied in cooking, you have more cooking value for your money than with the other fuels. It is a proven fact that a piece of meat roasted in an electric oven will lose less weight than if roasted in a coal oven or gas oven.

"Ranges are designed today to store heat, and the careful housewife saves much by knowing how to utilize this stored heat to the best advantage."

The speaker discussed the trend of design in ranges and appliances, and also spoke of other applications, such as electric bake ovens for bakers, and the heating and baking ovens used today in factories for various purposes.

Mr. A. L. Smith, of the Canadian Westinghouse Company, addressed the Luncheon briefly, and invited the members to take advantage of the consultant facilities afforded

Photo of the demonstrations carried out in their showrooms, during October, by the Mechanics Supply Co.

by the Illumination Department of his firm. Mr. George Wendt was also present representing the Westinghouse interests.

An entirely enjoyable luncheon, in which there was not a single dull moment, concluded with the singing of the National Anthem.

An Attractive and Impressive Demonstration

The electrical equipment on view in both the demonstration and display rooms of the Mechanics Supply Company evoked much interest and reflected great credit upon Mr. G. Lorne Wiggs, B.Sc., one of the members of the firm largely responsible for the details. An attraction of interest was an electrically-operated lantern slide machine known as a stereomotorgraph, manufactured by the Chas. Beseler Company, New York, N. Y.

Mr. Wiggs a Big Factor in Electrical Development

In conversation with "The Electrical News", Mr. Wiggs, the genial President of the Mechanics Supply Company, drew upon a fund of interesting reminiscence. Mr. Wiggs is well-known as one of the pioneers of electrical development in a romantic and historical city whose outward aspects still take us back to the time when the very elements of electrical science were unknown. Speaking of his early days, Mr. Wiggs recalled how as a boy he made experiments in the kitchen at home with sulphuric acid, copper and zinc plates, in an effort to produce electricity; and how later on when called upon to do so, in the addition of an electrical line to his business, he was able to go out after the store had closed and instruct some of the mechanics to install electric bells and electric lights. This was when the electric art was in its infancy and when few of the local tradesmen knew how to wire a residence. At that time he bought fuse wire by the yard,—now he buys it by the ton; then he purchased half a dozen cells (the dry battery not being known),—now he buys by the carload.

It was in 1899 that Mr. Wiggs, then a young man of twenty-seven, laid the foundation of his present business, whose ramifications today extend from Europe to Japan.

The company now employs a staff of seventy-five, many of whom have been identified with the firm upwards of twenty years. The Sales Department, for instance, is in charge of Mr. Walter R. Wilkinson, secretary of the company, who has been with the firm for more than a quarter of a century, both he and the vice-president, Mr. G. H. Simpson, having left school to enter Mr. Wiggs' employ. Other "old-timers" in this class are Mr. John Benson, Mr. J. E. Theberge, Mr. Claude McWilliam, Mr. Louis Ruel, Mr. Art. Matte and Mr. A. Morrisset, the two last-named now being directors of the company.

The Mechanics Supply Company's business is not confined to the electrical trade. They carry a full line of plumbing, heating, and engineering supplies, as well as automobile accessories,—each a business in itself.

From the standpoint of the electrical man, their headquarters on St. Paul Street, Quebec, are well worth visiting. The show rooms are a particularly interesting feature, housing varied and artistic lighting fixtures, household appliances, Westinghouse ranges, "Thor" washing machines, vacuum cleaners, and portable sewing machines.

Recently the firm added a complete line of radio apparatus. This department is under the direct supervision of Mr. G. Lorne Wiggs, B.Sc.

An extensive branch of the company's trade is the equipment of small towns and municipalities with independent telephone systems.

Mr. Wiggs is a rare example of presidential efficiency. The head of the largest business of its kind in the province, not only does he direct the general policy of his firm, but he keeps his finger upon all the administrative details. He it is who sees that the company's products are kept before the public—kept before his own particular Province of Quebec public in the two languages in which that public speaks. he is was who personally devised the elaborate and efficient system of record and book-keeping now in force—a system which is the outcome of years of painstaking study. He it was who devised the follow-up record in this system—with its predetermined totals of all the cash and credit systems—and who actually devised special machines for the practical operation of his ideas.

* * *

The special demonstrations at the headquarters of The Mechanics Supply Company, combined with the warmth of the hospitality shown at the Electrical Luncheon, cannot fail to have served to promote public interest in electrical progress in a section of the country where just such a touch of enterprise was most needed. For ourselves, the reminiscences of our genial host, Mr. W. H. Wiggs, have provided at least one member of the staff of "The Electrical News" with a particularly enjoyable recollection of Old Quebec—and the desire to return.

Has Cooked Electricall for 15 Years

Mr. Ralph B. McDunnough, general superintendent of the Public Service Corporation of Quebec, a report of whose interesting address at the electrical luncheon in Quebec City tendered to the Rotary Club is published in this issue, is a native of Montreal and an electrical engineering graduate of McGill University ('95). He has had extended experience at the Schenectady Works of the General Electric Company and with various operating companies in the States. For the past eighteen years he has been identified with the Shawinigan companies.

R. B. McDunnough

The financial statement of the Quebec Railway, Light, Heat & Power Company for the nine months ended September shows a very substantial increase in gross earnings, and as the operating expenses were below 70 per cent. (as contrasted with 74.56 per cent. for the nine months of 1921), the net surplus was consequently some $163,000 in excess of the surplus of last year. The actual net surplus for the nine months was $235,798, against $72,454 for the same period of 1921. The real significance of the statement for the nine months is to be found in a substantial reduction in operating costs. It is clear that on the strength of the earnings for the period covered, the company will show probably one of the best years in its history.

Efficiency of Peanut Tube as Radio Detector Dependent on Its Power Amplification

No Hump in Characteristic Curve—A Limit to the Efficient Increase of Plate Voltage—Best Results Obtained With Blocking Condenser and Grid Leak

By W. B. CARTMEL, B.S., M.A.*

Now I wish to say something about the amplifying and detecting properties of an audion. These tubes amplify both the voltage and the current. The voltage amplification factor depends on the design of the tube. The standard repeater bulb has an amplification value of 5.5 to 6.5, although there is a type of repeator bulb that amplifies the voltage twenty to thirty times and special bulbs are sometimes used that amplify two hundred times.

Power Amplification of Peanut Tube 187 Times

Our peanut tube amplifies the voltage anywhere from 5.5 to 6.5 times, let us say six times. What is meant by this is that if we put a voltage on the grid, the current in the plate circuit increases by six times as much as if we had added that much voltage in the plate circuit itself. Suppose for instance a battery of 1-1/2 volts be applied to the grid it will boost the plate current as much as six times 1-1/2 or nine volts added to the plate circuit. The current in the plate circuit is also amplified so that the power amplification of the peanut tube is 187, which means that the strength of a signal is amplified 187 times as was previously stated.

Why the Peanut Tube is a Good Detector

I would like to explain very briefly how it is that this tube which is essentially an amplifying tube is such a good detector, because you will realize the great advantage of standardizing on one type of tube provided it is capable of doing both jobs well. Many detector tubes as you know have a little hump in their characteristic curves. With such tubes sharp detection is obtained, but it is necessary to adjust the plate voltage so that the detection takes place on the hump of the curve. Such a hump on the curve renders the tube useless as an amplifier. The peanut tube has no such hump in its characteristic curve, and does not need any, because a different principle is used to accomplish detection. In order to explain this, let us consider a tube in which there is no grid and no plate battery. This you will remember is similar to the so-called Edison effect, already mentioned at the beginning of this paper. Edison placed a plate within the bulb of his incandescent lamp and connecting this plate with the positive end of the filament he was able to obtain several milliamperes of current. This was afterwards found to be due to electrons or particles of negative electricity flowing through the vacuous space of the lamp from the filament to the plate, and it is the control of this stream of negative electricity by means of a grid which gives us the modern vacuum tube. Now you will notice that since the plate is connected direct to the positive end of the filament, that it is at the same voltage as that end of the filament and therefore electrons do not flow from that end of the filament to the plate because, as we know, there must be a voltage between the filament and the plate, that is to say, a "B" battery, in order to get a flow of electricity.

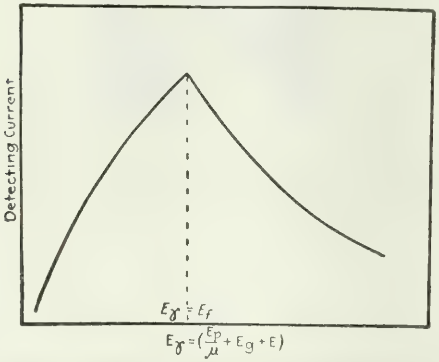


Fig. 1—Theoretical curve giving sharp detection for voltage

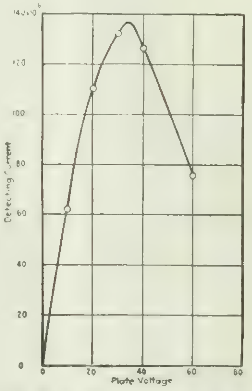


Fig. 2—Actual results from tube similar to peanut tube

Different Pressure Between Negative and Positive Ends

However, Edison probably used one hundred volts to light the filament of his lamp and therefore the voltage between the negative end of the filament and the plate was one hundred volts, which answered very well indeed to drive the current through the plate circuit. I think you will readily see that every point between the negative and the positive end of the filament is acted upon by a different electric pressure forcing electrons, beginning with one hundred volts at the negative end of the filament and diminishing to nothing at the positive end. You will see therefore, that there will be a corresponding flow of electrons. The electrons emitted from the negative end will be drawn along towards the plate very forcibly while the other portions of the filament will have their electrons driven less and less forcibly as we approach the positive end of the filament where the electrons are not driven over at all. Now, if we put an actual "B" battery in between the filament and the plate, the portions of the filament between the negative and the positive ends will be acted on more strongly and as we increase this plate battery, portions nearer the positive end of the filament will contribute more electrons until finally with sufficient voltage, a uniform flow will proceed from all parts of the filament. When this point has been reached, any further increase in plate voltage will only have a general effect in forcing electrons from the whole of the filament over towards the plate. It is at that place where there is a sudden change in the efficiency of the plate battery in driving over electrons that the tube is most efficient as a detector.

Voltage in Plate Circuit

Let us see if we can find out how much voltage must be used in the plate circuit in order to operate on the point in the detecting curve defined above. In detecting, we receive electrical oscillations on the grid and when detecting by this method it is necessary to have the grid at a negative potential, otherwise we do not obtain good results. Let us imagine, therefore, that the grid is attached to the negative end of the filament and we will suppose that we have put in a grid battery of, we will say, 1-1/2 volts in order to maintain the grid sufficiently negative. In addition to this grid battery there is another voltage on the grid to be considered, viz: the contact difference of potential between the grid and the filament. I have not said anything about this so fas, but such a difference of potential exists and this may be either positive or negative and may be as great as two volts. In the peanut tube this voltage is negative and the process of manufacture is kept down to less than one volt.

Additional Voltage Necessary on Plate

In order to make electrons flow all over the heated surface of the filament including the positive end, it is necessary to put additional voltage on the plate to overcome both the negative grid battery voltage and the contact difference of potential. Now, as previously stated, in the peanut tube from five to six volts are necessary in the plate battery to overcome the effect of one volt in the grid battery so that every volt or every fraction of a volt received at the grid times as much voltage applied in the plate circuit. Thereproduces as much effect in changing the plate current as six fore, if we take the grid battery voltage, say 1-1/2 volts, and add to it the filament voltage which is one volt in the case of the peanut tube, then add to that a voltage of from 1/2 to 1 volt contact difference of potential (we will assume 3/4 of a volt in this case), that will give us 3-1/4 volts, multiplying this by six gives us nineteen and a half volts as the proper voltage to use with this type of tube in order to get the best detection. This voltage varies with different tubes, but will be in the neighborhood of 19-1/2 volts.

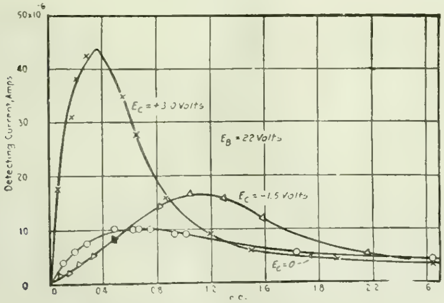


Fig. 3—Detecting current in three cases

Figure 1 shows us a theoretical curve worked out mathematically giving a sharp detection for the voltage as we have computed it, and Figure 2 gives the results of some experiments made on a tube of a type similar to the peanut tube. It will be noted that while the detecting current is a maximum in this tube with about 35 volts on the plate, there is almost as good detection over a range of from 23 to 43 volts. This is similar to the peanut tube which although having a maximum detection voltage, gives good detection over a range of from 17 to 22 volts .

Best Results With Blocking Condenser and Grid Leak

I have merely mentioned this method of detection because some of you may find it necessary in the circuits that you use, to make use of grid voltage detection rather than a blocking condenser in the grid, and I wish to emphasize the fact that this little tube is an excellent detector used in this way, because of its low filament voltage which makes it very sensitive. However, even with the peanut valve the best results are obtained by using a blocking condenser and a grid leak. In this case the best results are obtained with a positive potential on the grid or with the grid connected to the positive end of the filament. This gives much better results than with the grid connected to the negative end of the filament. I have no direct results showing the sensitiveness of this method except for the reception of continuous current telegraph signals by heterodyne.

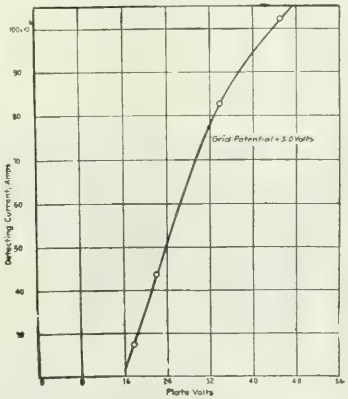


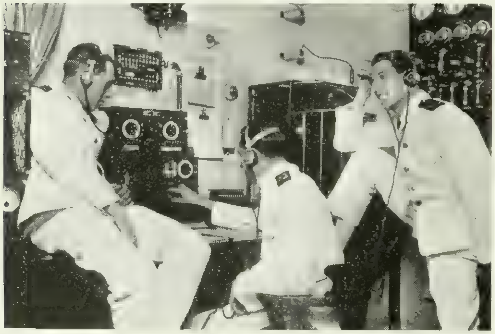
Fig. 4—Results of different voltages on plate in connection with heterodyne reception

Detecting Current in Three Cases

The curve I have here (Figure 3) shows the detecting current in three cases, one with the grid three volts positive, another with no potential on the grid and another with 1-1/2 volts negative on the grid. You will notice that for weak signals very much better results are obtained with the grid three volts positive in which case the detecting current rises to a sharp peak value as the signal strength increases and then rapidly falls off. You will note that with 1-1/2 volts negative on the grid there is also a peak to the detection curve, but that this occurs for a fairly strong incoming signal. With very weak signals no voltage on the grid gives better detection than 1½ volts negative, but that with three volts positive the detecting current is enormously greater for very weak currents than in either of the other two cases. What I wish to emphasize is merely that in using detection without a blocking condenser it is necessary to maintain the grid slightly negative in order to stop any flow of electrons to the grid and that the tube must be operated within a certain range of plate voltage, (seventeen to twenty two volts) unless the grid is made more negative in which case five or six volts must be added in the plate circuit for every extra negative volt on the grid. With blocking condenser detecting, we recommend on the other hand that the grid be connected to the positive end of the filament, and that if any voltage is to be on the grid this should be a positive voltage. In this case the peanut tube is not limited to twenty-two volts on the plate but higher values may be used. This may be seen from Figure 4 which shows the results of different voltages on the plate in connection with heterodyne reception using a blocking condenser on the grid.

Limitations of Peanut Tube

Before concluding about the little peanut tube I wish to speak about its limitations as to volume. All tubes are limited as to the amount of power which they will deliver. This is true of the largest power tube just as it is of the little peanut tube. This tube, however, gives a large output for a tube of its class, being capable of delivering a power output one hundred times as great as the amount delivered in a first class commercial telephone conversation. What is meant here by a first class commercial telephone conversation is the grade of transmission which the telephone companies consider satisfactory, which they try to meet in all cases, and which they usually exceed for local calls and sometimes exceed on long distance calls.



Wireless room and operators on the Canadian Pacific Liner "Empress of Scotland"

Power by Wireless?

Transmission of power from Niagara Falls to New York by radio is a possibility of the future, in the opinion of Dr. E. F. W. Alexanderson, chief engineer of the radio corporation. This prediction followed the success of a sixteen-hour test of electron tubes in place of large alternators, in transmitting wireless messages across the Atlantic ocean.

Reception on Train With Inside Antennae

Radio reception has been successfully accomplished on a fast-moving train using an inside antennae. Completely inclosed in a steel coach of the Broadway Limited over the Pennsylvania road, a concert from a station at Newark, N. J., radiophone messages from points a hundred miles and more distant, and code signals from a distance of several hundred miles were received. The receiving antennae consisted of an 18-inch loop.

Radio Amateurs on Increase in Quebec

Mr. David R. McWilliams, Inspector of Radiotelegraphs for the city and district of Quebec, recently stated that in the city of Quebec there are at the present time from fifty to seventy-five amateur receiving stations and a small number of transmitting stations all of which are of a very high order and with a range up to one thousand miles in some cases.

Radio Sales Prospects

A radio boom is predicted for this winter. The volume of sales in receiving sets and parts from the first of October until the end of 1923 is expected to entirely eclipse the turnover for the preceding six months. The bulk of orders for these sales were taken in April, May and June. Factories have been going at full blast all summer filling these spring orders, as well as the smaller summer demands. An effort is being made to propagate the idea of a "radio Christmas." The slogan will be "Give a radio set" and it is hoped to stimulate a huge volume of business that will last right up to Christmas.

Broadcasting For Fort William

At the organization meeting of the Twin City Radio Association, held recently it was decided to install a broadcasting station. R. P. Coats, organizer of radio clubs throughout the Dominion, stated that the new station would be in operation in about 3 weeks.

It is estimated that there are upwards of twenty radio receiving sets now located in different parts of Fort William and about half that number in Port Arthur. The premier set in Fort William is claimed by the Royal Theatre, which has instruments capable of receiving concerts from as far off as Atlanta, Georgia. J. H. Beamish claims to have the most powerful receiving set in Port Arthur.

Official List of Radio Stations in Canada

The official list of radio stations in Canada, as published by the Department of Marine and Fisheries, has been received. The list is attractively bound in blue and is so arranged that new editions can be filed within the same cover. The book contains a list of national call signals, international list of call signals, coast, land and ship stations in Canada alphabetically by call signal, coast and land stations alphabetically by name, ship stations alphabetically by name, a very complete list of amateur receiving stations and miscellaneous data. In this connection Mr. Edwards writes as follows:—

Department of Marine and Fisheries,
Ottawa, Oct. 9, 1922.

Editor, Electrical News:

I am enclosing herewith a copy of our first issue of "Official List of Radio Stations of Canada."

The price has been fixed at cost, viz; $1.00 per copy, including supplements.

If the publication of this list is to be an annual affair, it is essential that the present edition should be completely disposed of. A complete up-to-date list of Canadian Radio Stations must be of considerable value to everyone interested in radio.

You will notice that the cover has been made so that it can be used for future yearly editions, and holders would not have to purchase a cover with the next edition.

Yours very truly,
C. P. Edwards,
Director Radio Service.

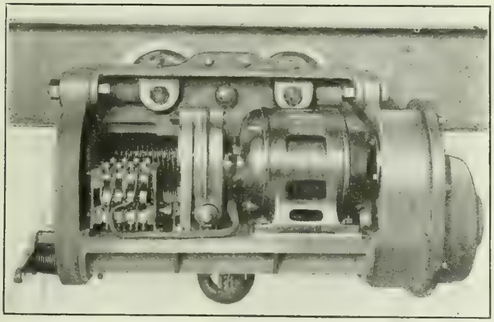
The Latest Developments in Electrical Equipment

Focussing Searchlight

The Diamond Electric Specialties Corporation. 101 South Orange Avenue, Newark, N. J., has recently placed on the market a portable searchlight which focusses a beam of light with a range from one to 100 yards. The lamp of the device which is fed by three dry cells is held in a cushioned holder to prevent breakage, and a shock absorber acts in the same capacity to protect the lens. The light is controlled by a contact switch which locks in the "off" position, and by means of this the light can be flashed intermittently or continuously. A hinged front is provided so that access can be had to the interior parts in addition to making lamp replacement easy. When not in use the handle is folded out of the way.

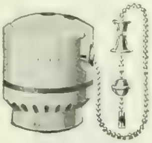
Electric Hoist

An electric hoist embodying several new features, has been placed on the market by the Standard Electric Crane and Hoist Company, 1420 Chestnut Street, Philadelphia, Pa. The main feature of this hoist is the short headroom dimension in which it will operate, the 3-ton hoist requiring only 14 ins. of headroom. It is claimed by the manufacturers that this feature allows materials to be stored and stacked much higher and that, furthermore, it is possible to operate this hoist in headroom spaces where it has been impossible to use one heretofore. The motor is, of course, especially designed for hoist service, being fully enclosed and of sturdy construction. Spur gears are used for the hoisting drive and are contained in the end housing. The main bearings are automatically lubricated by the "Alemite" system. An upper limit device breaks the electrical circuit and applies the holding brake, when the load block has reached its upper limit of travel.



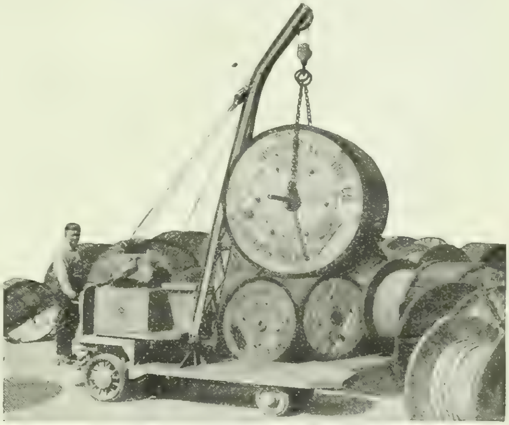
Short Back Receptacle for Ceiling Lights

Pass & Seymour, Inc., Solvay, N. Y., are placing on the market at this time, three practical devices for use with ceiling lights, ceiling bands or any standard or special unit. They fit the standard 1-½ inch throat of the ceiling units and provide individual control. The back of these Receptacles is 1-3/8 inches, and the ring is designed to give room for the glass in the shade holder of the unit. Wiring terminals are enclosed in the porcelain shell. This permits these receptacles to be used where weatherproof devices are required. Each receptacle is furnished with extra bell mouth which may be placed in the ceiling unit so that the chain or cord falls free of the glassware. The bell mouth acts as a guide for the chain where it passes through the shell of the unit or ceiling band.



Handy Portable Crane

The Elwell-Parker Electric Co., of Cleveland, Ohio, have recently developed a new storage battery operated electric revolving crane truck, wherein the battery serves as counter-balance and its compartment as a support for a double drum hoist unit operated by a single motor. Electric power to this motor is furnished from the same battery furnishing power to the main propelling motor. This motor drives the pair of larger wheels immediately back of the crane. This crane has a capacity of 3,000 pounds at 6-foot radius, or 1,000 pounds at 12-foot radius—truck load capacity 3,000 pounds—speed 5 m.p.h. One charge of battery will operate truck 15 to 20 miles. The attached illustration gives a general idea of the capacity of the crane, since it is here shown lifting a Dodge motor car. This equipment has been in use in locomotive shops for handling air pumps to locomotives, handling railway car wheels and axles, heavy reels of lead covered telephone cable, armored plates in the building of vaults in large banks, heavy loads in and off of street trucks, stacking of materials in warehouses and the loading and unloading of lighters at the water front, also handling motors to and from test blocks and chasses into railroad cars.

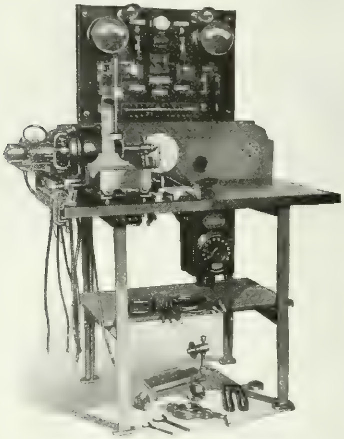


New Type Candle Socket

The Canadian General Electric Co. Ltd., are manufacturing a new type of candle socket, shown in the accompanying illustration, that contains new features in labor saving to fixture manufacturers and wiremen. The body of the socket is covered with mist gray paper which does not readily show the dirt. The terminals are exposed in such a manner as to make the wiring easy. The supporting yoke is made of ribbed and embossed steel to give strength and rigidity and has a polished nickel finish to prevent tarnishing and rusting. The yoke is designed in the form of a clamp with two screws which securely grip the candle fixture stem or nipple and obviates the necessity of threading this stem as in the ordinary form of candle socket where a threaded nozzle with set screws is used. This clamping yoke has another valuable feature in that there is from one quarter to three eights of an inch adjustment up and down the stem which allows a wide variation in the cutting of the stems or nipples and allows the socket to be easily adjusted flush with the outside shell of the candle.

Universal Test Bench

An improved universal test bench is being manufactured by Joseph Weidenhoff, 4352-58 W. Roosevelt Road, Chicago, Ill. It is claimed that this test bench places in the hands of the service station operator all the devices necessary for the testing of every make of starter, generator, magneto, induction coil, distributor, condenser, spark plug, moulded insulation, and insulated conductors.



Equipment includes mechanical circuit breakers, torque testing device, speed indicator, condenser testing device, low resistance master vibrator, cutout automatically controlled for 6 to 12 volts, 12 point adjustable spark gap, 3 point adjustable spark gap, test leads, plug sockets for reception of test leads, 110 volt test lamp, and magneto holding bracket with pulleys and belt.

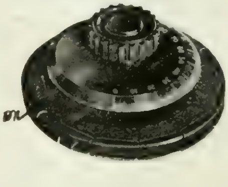
The drive motor provides any set speed from 200 to 3,500 r.p.m. with the speed controlled through a stepdown transformer.

Full Safety Motor Starters

The Nesbitt Electric Manufacturing Co., Ltd., 27 Melinda Street, Toronto, have a valuable little pamphlet describing their Full-Safety Motor Starters. This company is licensed to manufacture Westinghouse Full-Safety Motor Starters. These come in types: WK-10, WK-20, WK-30 and WK-100 with capacities ranging from the smallest motors up to fifteen horsepower, 550 volt. While the mechanism of each type differs, it is explained that the features of safety and reliability are common to all. These are: protection to the operator, protection to the motor, ease of installation and repair, simplicity of design and operation. The booklet describes the different types in detail with ample illustrations.

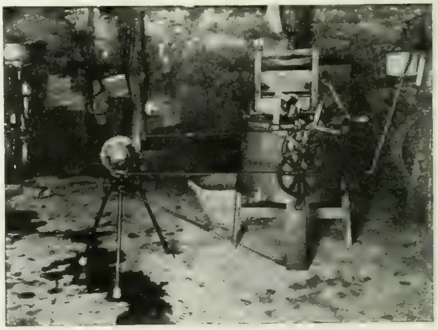
Rogers Receiving "Radiometer"

A tuning device of unusual construction has been placed on the market by Ludwig Hommel & Company, Pittsburgh, Pa. A pair of flat discs are used and the magnetic fields are divided into two separate components. The stationary disc is clamped to a panel bushing.



New Portable Power Stand

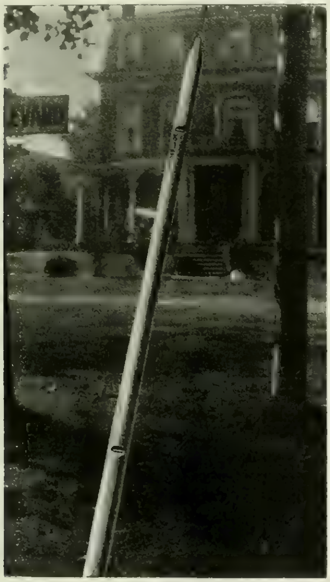
A new portable power stand has been developed by the Westinghouse Electric & Manufacturing Company to supply motive power for the various appliances found in every day use on farms and in stores, garages, and small machine shops. The stand consists of a ¼ horse power back-geared motor mounted on a tripod stand. The rotor speed of the motor is 1,750 revolutions per minute and the speed of the back-geared shaft is 210 revolutions per minute. Four power pulleys are supplied, two of which take a one-inch flat belt and the other two a ⅜ inch round belt. Through this system of back gears and the four pulleys a range of speeds is obtainable



and the motor can be belted to operate at the proper speed any device that can be worked with a ¼ horse power motor. The stand is light, weighing only 55 pounds complete. A wood-grip handle is mounted on the frame for convenience in moving. The stand is stationary when placed at work, for an adjustable, telescopic rod, which may be used either as a brace or as a tension anchoring device, is used to anchor it. Ten feet of extension cord is provided so that the stand can operate at any convenient place, even when located at some distance from the lamp socket.

A Makeshift in the Discard

It is rather unusual that as poleline hardware has been improved in almost every way that the guy wire that stands such a constant strain has been treated with such indifference where protection is involved. Just an old iron pipe or maybe a wooden contraption has been put around the wire and then the wire has been left to rust and bust or run the gauntlet with lady luck. No chance for inspection was possible, and disasters have occurred when the rusted guy wire has suddenly refused to continue to be treated so badly and let down whole strings of poles.



Just lately in one of Canada's largest cities hundreds of supposedly protected guy wires have been replaced—the old iron tubes and boxings being removed and a new specially designed protection put in their places. This patented contrivance consists of a curved galvanized steel sheet running up the guy wire and clamped to the wire by a couple of U-bolts. This protects and allows inspection and because it is open to the air on the underside, no rust can work without detection. This new device is a product of the N. Slater Company.

Brantford Oven & Rack Co. Adding Electric Bake Ovens

Electric bake ovens have been recently added to their line by the Brantford Oven & Rack Company, Limited, Brantford, Ont. These are made in connection with the Canadian Westinghouse Company, Westinghouse space heaters being used as heating elements. The new product is described in an interesting bulletin which is sent on request.

Connecticut Tel. & Electric Co.

In order to give their Canadian trade better attention and service, the Connecticut Tel. & Electric Co., Meriden, Conn. U. S. A. have appointed district sales representatives in Vancouver, Winnipeg, Toronto and Montreal, as follows:—Cochrane, Stephenson & Co. Ltd., 265 Portage Ave., Winnipeg; Cochrane, Stephenson & Co., 608 Pacific Bldg., Vancouver; Pierce Electric Co., 39 Richmond St. E., Toronto, Ont.; Timberlake & Bourne, New Birks Bldg., Montreal. This company has been manufacturing telephones and high class electrical and signal apparatus for over 28 years, and has a factory employing over 1,000 skilled electrical workers.

Besides the well-known Connecticut telephones, for interior use, this company also manufactures, Connecticut ignition for automobiles as well as the Connecticut radio apparatus. The interior telephone line consists of special systems for apartment houses, public buildings, schools, offices, manufacturing plants, etc. This company has also just placed upon the market a new hospital silent signal system which is entirely new, they also manufacture the well-known line of Connecticut annunciators, and push button specialists, and can furnish telephones for mine and street railway use, as well as for rural telephone exchanges.

Three Eureka Stores

The Eureka Vacuum Cleaner Company have opened up a new retail store at 218 Craig Street West, Montreal. This store is under the management of L. E. Seguin who was formerly with L. C. Barbeau and Company. This makes the third store of this company in Canada, namely, 218 Craig Street West, Montreal, L. E. Seguin, manager; 377 Yonge Street, Toronto, H. L. Tucker, manager; and at 610 Portage Avenue, Winnipeg, V. R. Homersham, manager.

Ace Manufacturing Co.

Guy S. Clarkson has just opened offices under the name of the Ace Manufacturing Co., at 304 Great West Permanent Building, Winnipeg. The firm manufactures an electric dishwasher, to be known as the Ace electric dish washer. This machine is 40 inches high, and 21 inches in diameter; it is finished in white enamel, with three narrow blue bands, and has two removable and interchangeable wire racks, capable of holding 42 pieces of china. This washer is on ball bearing casters, and has 1/6 h.p. Westinghouse motor; it is very simple to operate, only one gallon of water being necessary for a full wash, which can be done in a matter of a few moments. It is being manufactured to retail at a very conservative price and the firm report a large number of enquiries.

Mr. I. D. Livinson, eastern representative for Cid Fire Alarm Company, Reg'd., and E. H. Freeman Electric Co., Trenton N. J., has moved from 121 Bleury St., Montreal, to 2664 Park Avenue.

Current News and Notes

Abbotsford, B. C.

At a recent meeting of ratepayers it was resolved that a petition should immediately be circulated among owners of property in the townsite to find out if a majority of the owners were in favor of lighting the town under the provisions of the "Rural Lighting Act." Messrs. Hill, Shortreed and Webster were appointed a committee to draw up a tentative scheme for a 10 to 20 light system.

Charlottetown, P. E. I.

Mr. W. S. Grant, general manager of the Prince Edward Island Telephone Co., recently stated that the cost of the new long distance telephone being installed will run close to $100,000.

Chatham, Ont.

It is reported that a transmission line will shortly be built to the villages of Merlin and Fletcher.

Edmonton, Alta.

Federal plans for a chain of wireless stations extending right into the Arctic circle are being completed. The stations will be operated by the Dominion government with the primary purpose of keeping federal officials in touch with one another. The locations for the proposed stations are Fort Smith, Resolution, Simpson, Norman and McPherson on the Mackenzie, and the sixth at Dawson City.

Guelph, Ont.

Increased fares on the Guelph Street Railway went into effect recently. The new rules call for a six-cent cash fare; six tickets for 35 cents and twenty tickets for $1. Children will continue to be carried for three cents.

On Nov. 9, a sitting of the Hydro-electric investigating commission was held in Guelph. Its members heard a lengthy debate on "Hydro and its relations to Guelph." Added interest was given to the discussion because the Hydro Commission has been operating the local street car system for the last 18 months and expenditures for rehabilitation came up for discussion. Speakers were Ex-Mayor J. E. Carter, J. M. Taylor, head of the Taylor-Forbes Co.; Ald. Oakes and Joseph Tovell, G. J. Thorp, J. W. Lyon, Ex-Mayor Sam Carter, J. I. McIntosh, H. Gummer and J. J. Heeg, Chief Engineer Gaby, of the Hydro Commission, and H. E. Guilfoyle, the Hydro Commission's auditor, also gave evidence.

Hamilton, Ont.

The City Council has unanimously approved of the introduction of a by-law, so that the ratepayers may vote January 1 on the proposed Hydro-radial line from Port Credit to St. Catharines.

On Nov. 7 Barton Council refused to rescind the by-law passed at the last meeting, which authorized the formation of a Hydro-electric Commission for the municipality, with members of the Council, to carry on the commissioners' work until the next municipal elections are held. A deputation of ratepayers of the township was present, and urged that the by-law be rescinded.

Kirkland Lake, Ont.

The mines of the Kirkland Lake gold area received a full supply of hydro-electric power by the 1st of November. The Northern Ontario Light and Power Company carried out repair work in record time, the time occupied in reconstruction having been approximately four weeks. Considering the extent of the fire damage, including poles and wires for an aggregate of about 12 miles, the quick work of the power company is an outstanding achievement. As a result, the November production of gold from Kirkland Lake is expected to reach normal rate at least, and with indications of a substantially steady increase in output from month to month.

Kitchener, Ont.

Dr. J. E. Hett is building three houses, one on Park street and two on Peter street, equipped with radio receiving apparatus. He is a radio enthusiast and was one of the first to have a receiving set in this city.

London, Ont.

The trackless trolley buses, as designed by the Hydro-Electric Power Commission and operated at the Border Cities, are more economical as a means of civic transportation than the gasoline bus, is the gist of a detailed comparative statement, prepared by Sir Adam Beck, chairman of the commission, and submitted to Acting Mayor H. J. Childs, chairman of the finance committee of London city council.

According to the report prepared by Engineer Bunnell of Toronto, for the Civic Transportation Commission, the London Street Railway is worth $1,000,000 approximately. The report explains that the system is worth the amount named as a street railway property, "in use and useful," and refers only to its physical value. The report then deals with what should be an ideal system for this city. Dundas street is London's principal artery, and the opinion is given that all lines, for the main portion of the city, should run north and south from Dundas.

Peterboro, Ont.

The Canadian General Electric Company recently received a sizeable order from the Canadian Government Railways.

Portage la Prairie, Man.

Portage la Prairie has fixed a new schedule of rates for it's electric power. The domestic and commercial rate is increased from nine cents to 12 cents, while the minimum is increased from $1 to $1.50. Portage is on the hydro-power line, but for some time has been using the steam power as the transmission line was out of business for nearly two months.

Toronto, Ont.

The statement that serious consideration was being given to the advisability of making plans for the construction of a second canal at Chippawa to duplicate the power generating capacity there, in order to take care of power demands which would exist in this section of the Province by the time the second Chippawa plant would be ready for work was recently confirmed by Sir Adam Beck. Regarding water for the second canal Sir Adam said: "In our agreement with the United States we are allowed a water diversion of 58,000 cubic feet per second. The Chippawa canal uses 18,000 second feet. We could build another canal and scrap both old plants as we have scrapped one. We would have 40,000 second feet available."

Vancouver, B. C.

There is abundant opportunity for the development of water power throughout the area immediately adjacent to Vancouver, with the necessary elevation and rainfall to permit of the creation of a hydro-electric system sufficient to meet the needs of the city for many years to come, in the opinion of Mr. J. G. Kerry, of Kerry & Chace, Toronto, consulting engineer engaged by the city to conduct an investigation into possible water power sites in the district, with a view to the city acquiring its own power system. All government land within a radius of 100 miles from the Vancouver city hall will be withdrawn from filing and set aside as a crown reserve for waterpower development, if recommendations made to the government by Mayor C. E. Tisdall, are approved at Victoria. Mayor Tisdall had a conference with the government, following submission of a preliminary report by Mr. Kerry.

The Canadian Marconi Company, in co-operation with the parent company in England, is contemplating erecting at Vancouver what will probably be the largest and most powerful wireless station in the world, for direct communication with Australia and the East. It will cost upward of two milion dollars, and will be the last word in modern wireless installation. Whether the work will be proceeded with or not depends to a large extent on the attitude of both the Canadian and British Governments. Mr. H. W. Allan, joint manager of the Marconi Wireless Telegraph Company of London, and S. F. St. John Steadman, director of the company, also of London, have been in Ottawa interviewing the Government on the matter, and have made formal application for a license to proceed with the work at the earliest possible date.

Vernon, B. C.

A by-law making several changes in light and power charges, was recently presented to the council. The by-law aims to encourage sign and window lighting by a modification in existing rates. Motor service is taken on the basis of a yearly signed contract. Minimum rate on heating appliances is $1.50 a month. It is proposed to raise the rate on water heaters to 1¼ cents, less 10 per cent, per kw.h.

Victoria, B. C.

The Sun Electric Company's tender for wiring for telephones and radio in the new Jubilee Hospital building was accepted by the Hospital Board. Others tenderers were the Murphy Electric Co. and Hawkins & Hayward.

Winnipeg, Man.

Seeking control of radiotelephony, executives of the Western Provinces Government telephones systems will recommend, through the Ministers of Telephones to their respective Legislatures, the transfer of authority from the Federal to Provincial Governments of the enforcement of the Radio Telegraph Act dealing with radiotelephony.

High River, Alta.

Mr. P. Terry, mechanical engineer, of the municipal light plant at High River, Alta., has secured a position as mechanical engineer and will superintend the Vulcan light and power plant at Vulcan, Alta.

Drumheller, Alta.

The Lines Electric Co., Ltd., of Drumheller, Alta., have recently been awarded the contract for wiring and lighting fixtures, for one store and six offices. Owner J. Gouge.

The Valley Electric Co. of Drumheller, Alta., were recently awarded the contract for wiring the new municipal hall at Drumheller, Alta.

The Drumheller Co., Ltd., Drumheller, Alta., are installing a new tribune in their power house.

The Mine Power Company Ltd., Drumheller, Alta., are installing two Leonard horizontal return tubular boilers, 150 h.p. each, forced draught, and fitting them up for future installation of Jones underfeed stokers; also installing one 300 kw. Curtis turbine and voltage regulator to take care of entire load; also contemplate an additional two miles of line work.

Wiring Contracts Awarded

Barrie, Ont.

W. Stephenson, $3,000 res., 15 Bersey St.

Bridgeburg, Ont.

Anger Electric Co., $10,000 res., Niagara Bld.

Brockville, Ont.

Code & Lett, $10,000 add. to factory.

Bronte, Ont.

Wm. McDonald, $7,000 on res.

Chatham, Ont.

H. Cartier, 112 Sheldon Ave., $38,000 school, Victoria Ave.

Hamilton, Ont.

Mr. Smith, $2,500 res., Connaught & Cannon Sts.

L. H. Lander, 155 King Street E., altn. office bldg., Lister Bldg.

John Dynes, Prospect St., $10,000 apt., Emerald W.

Kingston, Ont.

J. Harris, Cooper St., $20,000 curling rink, Clergy St. W.

Kitchener, Ont.

Doerr Electric Co., 214 King St. W., $30,000 building., 83 King St.; $7,000 res., Homewooed Ave.; $3,500 res., Henry St.

Chas. Schmidt, King & Scott Sts., $4,000 res., Lancaster St.

Star Electric Co., 91 King W., $8,500 res., Wellington St.; $4,700 res., St. Leger St.

Milton, Ont.

Harry Alexander Ltd., 6 King St. W., $75,000 office & warehouse.

Mimico, Ont.

Roxborough Ltd., 36 Front E. Toronto, $10,000 res. Lake Shore Rd.

Warner & Fordyce, $4,500 res., Lake Shore Road.

Moncton, N. B.

Wm. G. Crowley, St. George St., $3,500 res., Caledonia St.; $6,000 res., Cornhill St.

Edgar LeBlanc, Church St., $5,000 res., Archibald St. Extn.

Montreal, Que.

J. Artiz & Co., 1395 Bordeaux St., $14,000 res., Delormier Ave.

Booth Bros., 5727 Sherbrooke W., $200,000 24 res., Oxford Ave.

G. Houle, Verdun, $7,000 res., Mariette.

O. Labelle, 332 Seigneurs St., $8,000 res., Montclair Ave.

Mr. Mantiel, $35,000 pr. semi-det. & single res., Old Orchard.

F. Neyrinck, 809 De Gaspe St., O'Shaughnessy.

J. A. St. Amour, 2173 St. Denis St., $170,000 school and res., "St. Anselme"; $200,000 school "St. Arsene Parish", Christophe Colomb.

Sayer Electric Co., 87 Bleury St., $28,000 presbytery, Delorimier.

A Seguin, 1305 Bordeaux St., $50,000 altn. res., 65 Drummond St.

Mount Royal, Que.

Sayer Electric Co., 87 Bleury St., on residence.

North Sydney, N. S.

Ellis & Co., $7,000 res., Queen St.

McKinnon & Coleman, $3,000 store, Stanley St.

North York Twp., Ont.

G. McKee, Bellwoods Ave Toronto, on add. to school.

Ottawa, Ont.

P. Ackroyd, 416 Bank St., $13,000 duplex res., 1st Ave.

H. L. Allen, 272 Bank St., $5,000 res., Bayswater Ave.; $9,000 garage, Coulborne Ave.

A. Aubrey, $5,500 res., Rockwood Ave.

Jos. Burns, $5,000 res., Stewart St.; $5,000 res., 1st. Ave.

W. Cherry, Rideau Terrace, $6,000 res., Pansy Ave.

E. Headly, 645 Echo Dr., $5,500 res., Aylmer Ave.; $5,500 Ossington Ave.

Mr. McClelland, $5,000 res., Grove Ave.

Mr. Rennie, $5,500 res. & garage, Metcalfe St.

Rideau Electric Co., Daly Ave., $4,500 res., Helena Ave.

G. Young, Spruce St., $6,000 res., Ossington Ave.

Sayer Electric Co., 87 Bleury St., $60,000 four cottages, Dollard Ave.

Quebec, Que.

F. Gingras, 34 St. Augustin St., $40,000 add. store., St. Joseph & Liberte Sts.; $125,000 alts. bank, St. Peter St.

A. Picard, 199 St. John St., $27,000 add. school, St Joachim St.

Regina, Sask.

Espley Elec. Co., 2160-12th Ave., $3,500 res., 16th Ave.

Rockcliffe, Ont.

E. Headly, 645 Echo Drive, $6,500 res., Cloverdale Rd.

St. Catharines, Ont.

H. C. Holmes, 30 Ann St., $4,000 res., George St.; $4,000 res., St. George St.

Sandwich, Ont.

A. H. Cook, 609 Moy Ave., $10,000 three family terrace, London St. & Indian Rd.

Jno. Maillaux, 1420 Erie St. E., $3,500 res., Rankin St.

Sault Ste Marie, Ont.

J. Penfold, 76 Pim St., $3,500 res., Forest Ave.

Taylor Bros., Gore St., $3,000 res., Spruce St.

Three Rivers, Que.

J. B. Badeaux, 446 St. Maurice St., $30,000 extn. convent, St. Charles.

Toronto, Ont.

Geo. Arbour, 27 Belsize Dr., $7,500 store & apt., 2476 Yonge St.

Geo. Armstrong, 1391 Ossington Ave., $75,000 6 stores & apts., St. Clair West.

Canada Electric Co., 175 King E., $40,000 rebldg., loading platform & cattle pens, Union Stock Yards.

Cavers & Harvie, 702 Brock Ave., $7,000 each, Yonge & Erskine Ave.

W. Chittingdon, Earlscourt Ave., $4,500 res., Earlscourt Ave.

J. A. Craig, St. Annes Rd., $18,000 4 det. res., Glendale Ave.

Douglas Bros., 2317 Yonge St., $4,500 res., 54 Hillsdale Ave.; $9,000 1 pr. res., Duplex & Hillsdale Ave. E.

Douglas Electric Co., 2525 Yonge St., $7,000 res., Stibbard Ave.

P. J. Dunn, 3150 Dundas W., $10,000 each 3 res., Patterson Ave.

H. J. G. Ferguson, 69 Boon Ave., $12,000 res., Glen Grove Ave.

Geo. Armstrong, 1391 Ossington Ave., on res., 112 Westmount Ave.

Walkerville, Ont.

W. T. Carthew, 138 Moy Ave., Windsor, $18,500 res., Devonshire Rd.

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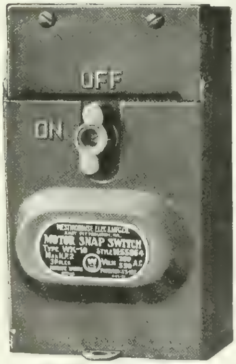
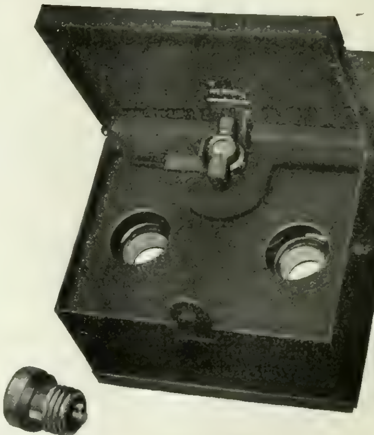


Type WK-10
For motors up to 2 H.P.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Progress Toward a Uniform Standard of Electrical Specifications

The Legislative Assembly of the Province of British Columbia has passed an Act to "Provide for the Inspection and Regulation of Premises and Equipment for the Generation, Transmission, Supply or Use of Electric Energy." In a general way the conditions under which these inspections will be carried out are very similar to those which obtain in the Province of Ontario. A staff of inspectors will be appointed, over which a chief inspector will preside, and any inspector has the power, at any time, to enter any premises where any electrical equipment is being used, to inspect and examine this equipment, and if necessary, to require that its use be discontinued. According to the act the inspector may examine plans and specifications of electrical equipment to be installed, though it does not appear that this authority is intended to include the installation of wiring.

One of the difficulties in the Province of British Columbia, as in a number of other provinces in the Dominion, has been the possibility of importing equipment that does not meet the requirements of such bodies as the Underwriters' Association, or the Hydro-electric Power Commission of Ontario. While there has been a moral influence exerted to keep equipment that does not come up to standard out of the country, this influence in the past has not been sufficient and as a result much material that is decidedly below standard has been introduced, in spite of the protests of those who have the interests of the electrical industry most at heart. An example of this was an electrical iron, which we recently mentioned as having been introduced into the Province of Quebec, and which did not meet the requirements of the Underwriters' Association. The industry in that province was practically helpless, because there was no law to prevent the importation and distribution of this equipment. The B. C. Act would seem to take care of this matter, however, in that province, for it says, "where any electrical equipment installed in any premises is deemed, by the inspector, to be dangerous, to person or property, he notifies the owner of these premises to discontinue its use." In addition to this, where the inspector is of the opinion that electric equipment of any specific manufacture is so dangerous, to person or property, that it ought not to be permitted within the province, he may give notice directly to the manufacturer, or through the Gazette, that no person shall, within the province, sell any electrical equipment of that manufacture.

British Columbia by this Act is moving in the right direction, and we hope it is only a matter of a short time before all the provinces can agree on some uniform plan for regulating not only the wiring installations in our homes, but also arrange a standard by which all household equipment must be judged—as well as other electrical equipment. As mentioned elsewhere in this issue the Canadian Engineering Standards' Association is working to the end that a conference be held in Ottawa, at which representatives from all provinces should be present, with a view to giving Dominion wide recognition to some set of standards that may be determined. It may be that the Underwriters' Laboratories' Standards would not meet with uniform approval. Possibly also the rules and regulations of the Ontario Hydro Commission may be subject to certain criticisms in the other provinces. These are matters, however, for discussion, and surely a compromise could be reached.

In discussing this question we must not lose sight of the fact that these are times when industrial economies are absolutely essential. Anything therefore that tends to reduce the cost of construction, and the expense of carrying on, should be considered. If the manufacturer finds it necessary to make equipment to one specification in Ontario and to another specification in, say, Alberta, this condition adds to the cost to the consumer in both provinces. However, it does not add anything to the protection of the citizen, as the requirements have been specified by different groups of men, equally well advised on the problem and equally anxious to protect the public. It is simply a matter of not getting together.

We consider the proposed convention in Ottawa a very important move. It would probably not be difficult to convince such a convention of the necessity for standardization. The next step would be a convention of electrical men to decide among themselves, definitely, just what the requirements to be specified should be.

The Legal Responsibility of Electrical Workers

A case that was recently decided in the Superior Court, in Montreal settled an important point in regard to the legal responsibility incurred by electrical contractors or other electical firms undertaking repair work.

The stated facts of the case were that an electrician was called to do some repairs to the elevator of the Crescent Turkish Bath Company. The electrician arrived, and instructed the engineer of the company to rotate the elevator motor by hand. This was done, by means of a pipe wrench put on the axle of the motor.

The electrician then asked the elevator boy to try to take the elevator up. The engineer here intervened and said that it could not be done, but that he could start the elvator from the switchboard. He was instructed to do so by the electrician. On turning on the power, the pipe wrench which had been left on the axle of the motor, flew off striking the electrician and breaking his arm.

Action was taken by the electrician against the Crescent Turkish Bath Company, under the common law, and was for the amount of $2,000 damages.

The court held not only that the essential allegation of fault had not been proved by the plaintiff but as the plaintiff had been sent as an electrician for the purpose of repairing the elevator, and as the work of repairing was under his control, he was to be considered in charge of the permanent employees. Consequently it was his duty to exercise such a supervision over the operations as to prevent accident, which the judge said, he had not done, and so he was himself to blame for the damage suffered. The action was dismissed.

The finding would appear to establish the fact that where an outside firm send an electrician to do repair work the electrician is deemed to be in charge of the repair work and responsible that due care is taken in its execution. If he suffers damage by reason of the fact that he has not taken such care, he can not recover. There are many other contingencies suggested, arising from the above, and the only way to guard against trouble of this kind would appear to be for the management of electrical firms to make sure that their outside men thoroughly understand their responsibilities.

Can not Electric Store Fronts "Stand Out"?

A point brought out by one of the speakers at the recent convention of the Ontario Association of Electrical Contractors and Dealers was the fact that it is difficult to recognize an electrical store. He stated that he travelled over all the business section of a certain city, looking for electrical stores and passed by many of them for the reason that these stores seemed inconspicuous.

It is not difficult to say why these stores seemed inconspicuous; some of the reasons are inherent to electrical merchandise, others are simply due to poor performance on the part of the dealer.

As one of the inherent reasons we would say that the electrical line is so varied, there is no one thing used for window display that sticks out prominently. Another is the fact that the goods are handled by different kinds of stores. But aside from these reasons no one can mistake an electric store that carries a bright electric, sign, nor can he pass a window unnoticed that is remarkable for the beauty of its lighting.

The writer has received sundry jolts from the signs that shoe repair men stick up. Every once in a while he sees a sign "Electric Shoe Repairing" and it is sometimes accompanied by the representation of a forked bolt of lighting. Of course, that kind of a sign would not do for an electric store, but the point is, the shoe repair man thinks enough of the electric end of his business to advertise it, and the lightning bolt is conspicuous.

A store front that tells the passer-by what is sold therein in no mistaken terms, means better business.

Radio Acquiring a Firm Foundation

The broadening and improvement of radio programmes is a hopeful sign of healthy growth. Church services are included in the latest broadcasting schedules, and the fact that such an innovation fills a real need, extending the privilege of worship to thousands, speaks well for the future of radio.

Those who are most enthusiastic about the change are many of them aged people, too feeble longer to go to their churches, but anxious in their desire for spiritual uplift. Others are invalids, condemned to spend their lives in a single room. In many country districts, the churches are remote; in one case it is known that a little group of neighboring farmers gathered at the home of one of their members, who had a powerful receiving set with loud speaker, and listened in, making the responses and joining in the congregational singing.

There are other things that radio does that can be effected in no other way—let us hope that it may win to the point where broadcasting will be recognized by the people as a necessity of the same class as the postal service.

Canadian Engineering Standards Association

The semi-annual meeting of the main committee of the Canadian Engineering Standards Association, was held November 13 in Ottawa. Mr. H. H. Vaughan in the chair. After the transaction of formal business, the secretary reported that the membership of the association as of October 1st was 285, all members taking part in the work of various active committees of the association. Progress reports of the various working committees were presented, and it was announced that the specifications for steel highway bridges, incandescent lamps, watthour meters, wood poles for transmission lines, flexible wire rope and strand for aircraft, and commercial bar steel are well advanced or are ready for publication, that for steel bridges being in the press. The specification for flexible wire rope and strand for aircraft was approved for publication.

It was decided to take action in connection with a request for the Association's co-operation in connection with specifications for electric overhead crossings, the organizations interested in this case being the board of Railway Commissioners, the steam and electric railway authorities, the power companies, and various power commissions, the provincial governments, and the various telegraph and telephone companies.

The secretary reported that a number of favorable and some unfavorable replies had been received to the invitation sent out by Hon. Mr. Robb, Minister of Trade and Commerce, for an interprovincial conference to be held under the auspices of the association regarding the possibility of obtaining Dominion-wide agreement as to the requirements for the design, inspection and installation of electric fittings, appliances and equipment, and it was hoped that the conference in question would shortly be held.

According to a well known botanist, seaweed contains a large amount of alcohol. This looks as if the bed of the sea within the three mile limit in America will have to be thoroughly overhauled.—Punch

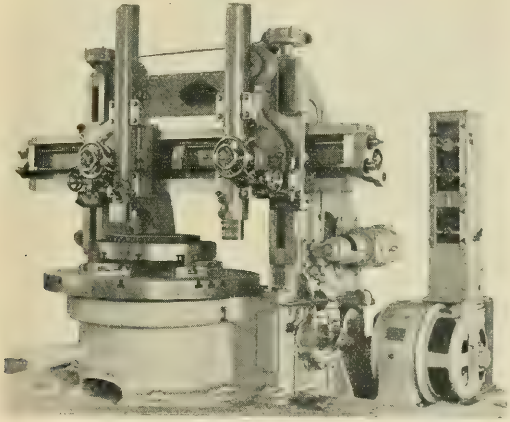
The Application of Electricity in the Manufacturing Industry--11

Metal-Cutting Machine Tools Largely Motor-Driven —Variations in the Type of Drive Required—Methods of Speed Changing—Special Adaptations for Planer Use

Electric motors are in very extensive use for driving machine tools. The recognition of their advantages for this purpose has not been delayed, and in districts where electric power is available it is unusual to find any other type of power.

Standardization of motors is a feature, welcomed by manufacturers and consumers alike, that has had its part in advancing the use of electric drive. There are many advantages to be gained from this, notably in the reduction of manufacturing costs and delivery periods, and in the satisfaction of the user.

It may be pointed out, however, that there is room for improvement in the substitution of individual for group drive. This condition is gradually being remedied, due greatly to the co-operation of motor manufacturers. At the present time there are being manufactured motors that will take care of any machine tool service, and the result is that many machine tools are sold with the motor an integral part of the machine. This of course, helps the general adoption of individual drive.



A boring mill developed in England. Traversing, etc., by separate motor.
Photograph courtesy Alfred Herbert, Limited

There are certain cases where group driving serves the purpose of highest economy but for tools requiring approximately 5 h.p. or above the individual motor drive has an overwhelming advantage, owing, among other things to the reduction of total power required, to the improved illumination obtainable in the shops, to the greater flexibility in locating machinery, and finally, what is of vital importance, the increase in output per unit machine.

There are variations in the type of drive required. The following list enumerates the main classes:—

1. Constant speed main drives.
2. Variable speed main drives.
3. Constant speed auxiliary drives.

When Constant Speeds are Used

The constant speed main drive is the case of a constant speed motor, where all changes of spindle speed and feed are effected by mechanical means, such as gears or special pulleys.

In Canada it is uncommon to find direct current used for this purpose, but its use is quite prevalent in England. Either shunt or compound-wound motors are used. The shunt motor will suit the majority of cases, but where the machine tool possesses a large flywheel effect the compound-wound motor is preferable, as the speed variation with alteration of load is greater than the shunt-wound motor. This enables the flywheel effect to be utilized more efficiently for overcoming sudden and peaky loads. It is also advisable to adopt a compound-wound motor in all cases where a heavy starting effort is required.

Where alternating current is used, as obtains in the great majority of installations, the well-known squirrel-cage and slip-ring motors are the types used. There are many questions to be considered before either type is finally adopted.

Starting Conditions

The squirrel cage motor, is, of course, the simplest motor constructed. The only wearing parts are the bearings, the rotor is practically indestructible, no brushgear is necessary and the risk of breakdown is minimized. In general, however, a squirrel-cage motor of the highest efficiency will exert a starting torque of only ½ to 2/3 full-load torque with a starting current of from 1½ to twice full load current. On the other hand, a slip-ring rotor type motor is capable of starting against full-load torque with full-load current, or, if necessary, twice full-load torque with approximately twice full-load current. It is self-evident that a squirrel-cage motor cannot be used for the drive of machine tools requiring a heavy starting effort, unless some form of clutch is fitted to enable the motor to start light.

The heavy starting currents required by squirrel-cage motors are another factor that must be considered. Again, although automatic control can be used with squirrel-cage motors, such starting equipment is expensive and it is generally preferable to install a slip-ring rotor type motor when this type of control is required.

To sum up, therefore,—although no hard and fast rule can be laid down the use of squirrel-cage motors is recommended for the drive of machine tools requiring up to 20 h.p. where hand-operated control is desired, and slip-ring rotor type motors in all other cases.

Characteristics of Variable Speed Drive

Many manufacturers are putting direct current variable speed motors on the market. One firm makes these available for speed ranges of 4:1 and 3:1 and 2:1. Other firms have also standardized on this class of service.

The consideration of first cost also enters the question. A variable speed motor costs more than the equivalent constant motor which would be used for the same machine tool. The extra cost when taken as a percentage of the complete cost of the machine-tool equipment would, however, be small. The speed range obtainable on the motor itself enables the machine-tool maker to dispense with a gear box altogether in some instances and reduce the number of gear ratios in others. The wearing parts of the machine tool are therefore reduced. In addition, very fine speed increments over a wide range can be obtained, as against the definite number of fixed speeds obtained with mechanical change gear. A variable speed motor geared direct to the machine tool, enables the highest economical cutting speed to be easily and quickly found by the operator. The increased output resulting from the delicate speed control is claimed to very soon counterbalance the increased initial cost.

Requirements of Constant Speed Auxiliary Drives

This type of drive is required for operating the quick traverse motion of tool slides, tailstocks and saddles, in cases where it is preferable to use a separate motor for the duty, and the motor only operates at its normal load for short periods.

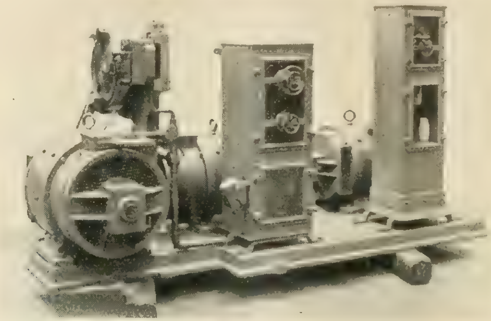
For this purpose a compound-wound motor may be used having a half-hour rating. The squirrel cage motor is often used for this purpose. Its use cannot be declared the most efficient, as for these purposes the motor is required to reverse, and its operation is more satisfactorily accomplished from the point of view of the control-gear with a slip-ring motor.

It may be pointed out that enclosed motors are desirable, to keep chips out of the interior of the motor. In some severe cases pipe-ventilated or drip-proof types are necessary.

The Development of Reversing Tool Drive

The old-fashioned method of mechanical driving of planers and such tools by means of two belts and a belt shifting gear is both wasteful and unsatisfactory and offers considerable scope for improvement. The use of a reversing motor whose direction is controlled by the moving head is an obvious step; the addition of a motor generator of which the direction and strength of the generator field are so controlled is a marked improvement on that method.

There have been some interesting developments in this field. One English manufacturer commencing with a reversing motor, geared directly to the planer table, gradually evolved a slip-ringless magnetic clutch which, it is claimed, offers considerable advantages over the direct drive. For instance, the amount of stored energy to be dissipated at each reversal is much less, consequently the power required to drive the tool is less than with the reversing motor.



Electrical equipment for planer. Complete conversion and control of current. Photograph courtesy Alfred Herbert, Ltd.

Moreover, the effects of inertia due to rapid rotation and reversal of heavy armatures, which are necessary if maximum output is to be achieved, are eliminated.

In the course of his experiments this manufacturer came to the conclusion that the advantages claimed for electrical regeneration were considerably over-rated and involved complications in the switchgear and wiring which are expensive both in first cost and upkeep.

These and other inherent disabilities of the reversing motor drive resulted in him discarding the clutches. Even with this change it was still found that, under the most favorable conditions, with a 40-ton planer table and job operating at normal speeds, the inertia effects of the table and revolving clutch armature were considerable.

Roughly, the advantage secured from the change was in the neighborhood of 45 per cent., reckoning the saving in the power input for a given tool and the reduced period of time within which a complete working cycle could be performed.

Further, research, with the object of securing (a) minimum demand from power mains and (b) the maximum speed of reversal has resulted in a purely mechanical reversing drive which it is claimed gives the maximum output and minimum input ever attained.

The advantages claimed are demonstrated by the following data, taken from a machine thus equipped:—

(b) Planer 3 ft. 6 in. by 3 ft. 6 in. by 9 ft. 0 in., having formerly a magnetic clutch, now replaced by new drive.

Original cutting speed 37 ft. 0 in. per min., now 40 ft. 0 in. per min.

Original return speed 155 ft. 0 in. per min.,now 148 ft. 0 in. per min..

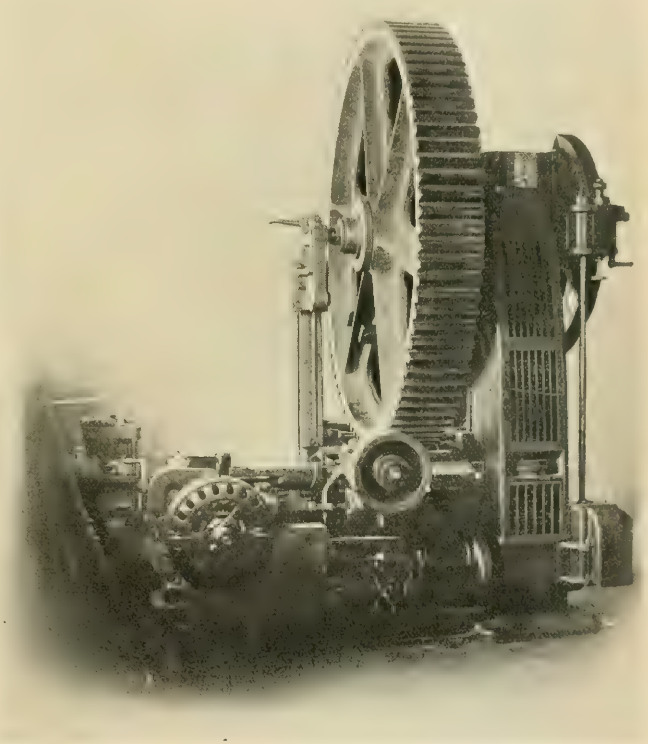
Times required to perform 10 cut and return strokes

Stroke	Magnetic Clutch Drive	New Type Drive
1 ft. 0 in.	1 min. 8 secs.	0 mins. 24 secs.
2 ft. 0 in.	1 min. 50 secs.	0 mins. 43 secs.
3 ft. 0 in.	2 mins. 20 secs.	1 min. 3 secs.
4 ft. 0 in.	2 mins. 36 secs.	1 min. 23 secs.
8 ft. 0 in.	4 mins. 30 secs.	2 mins. 42 secs.
TOTALS	12 mins. 24 secs.	6 mins. 15 secs.

Increased output over 98 per cent.

Control of Machine Tool Motors

Whilst it is now generally recognized that the individual motor drive of machine tools leads to increased production, it has not yet been sufficiently realized that efficient "motor control" may also contribute very materially in this direction. In fact "motor control" is quite as important as "motor drive."



Cutting a large spur gear on a motor-driven Browne & Sharpe spur gear cutting machine. Some idea of the size of the job may be gained from a knowledge of the fact that the finished gear is 90 inches in diameter and has a 12½ inch face. This gear is a steel casting cut from the solid. The gear cutting machine is driven by a 10 horse-power Westinghouse squirrel cage motor at 750 revolutions per minute. A rawhide pinion is used in the motor connection to the driving mechanism. One man runs three machines of this type. Photograph courtesy Hamilton Gear & Machine Co., Toronto.

The starting, stopping and speed control of a motor driving a machine tools are very important factors in its operation and can be accomplished:—

(a) By hand-operated control gear—The control of the motor and tool is in the hands of the operator, and the human element with its liability of error cannot be entirely eliminated.

(b) By automatic contactor or remote control gear.—The workmen may obtain complete control of the tool and motor by simply operating a push button or small master switch fixed at some convenient place near his working position, the main control gear being fixed some distance away.

With this type of control gear, the responsibility for cutting out the starting resistance correctly does not rest with the operator, but is done for him automatically by current-limiting devices which prevent any dangerous rush of current when starting up, and correctly and smoothly accelerate the motor up to speed in the shortest time. It is, therefore, impossible for a careless operator to damage the motor when starting up.

The stopping of the machine in the ordinary way takes a long time but by the adoption of automatic control arranged for dynamic barking this time can be much reduced, and the machine stopped and restarted repeatedly in the shortest safe time. Idle and non-productive time can therefore be reduced to a minimum, and the production per unit machine increased.

The chart, Fig. 1, taken by a recording ammeter in the circuit of a motor driving a machine tool possessing large inertia, clearly shows the advantage to be obtained by using the dynamic brake, in regard to the elimination of non-productive time. Mechanical brakes are provided by the makers on certain machine tools for quickly stopping the auxiliary motors. These can be operated by means of standard brake solenoids.

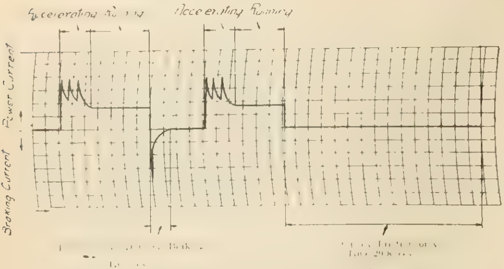


Fig. 1—Advantages gained from a dynamic brake

Electric Fan Can Be Used to Warm Average Room

Editor, Electrical News—

Articles have recently been published in the electrical press advocating the use of electric heaters. In some of these articles the suggestion is made that electric heaters should be used during very cold weather to help out the domestic furnace.

Now it is all very well to give all possible publicity to the advantages of electric heaters; they are most excellent things in their way, but too much, even of a virtue, is apt to become a vice, and a multiplicity of heaters switched on during the winter peak will create a most vicious condition of voltage regulation—so much so that electric lighting will be extremely poor and electric cooking almost impossible if the heating load should coincide, as it probably would do, with the lighting and cooking loads.

There is, however, readily available, a method of helping the furnace, which, while not crippling the resources of either generating stations or distributing systems, will benefit the householder; this method is to employ an electric fan on the very cold days instead of a heater.

To most people it is not news that the temperature at various levels in an artifically heater room is far from uniform and actual tests show that, under ordinary conditions, the following temperatures may be found in the average room during the winter time in this country:

At floor level .... about 58 degrees Fahrenheit
At five feet above the floor . about 68 deg. Fahrenheit
At the ceiling .... about 80 degrees Fahrenheit

Actual trials made by the writer have shown that, in a room of average size, a 9 inch electric fan will so circulate the air (if pointed at an angle towards the ceiling, there need be no draught felt) that the above temperatures will in a few minutes become, respectively, about 60 degrees F., 65 degrees F., and 70 degrees F., thus creating a very much more comfortable condition.

Not only are one's feet actually warmer but the temperature around the feet and head respectively are much more nearly equal. This in itself tends towards increased comfort. Again, the excessive amount of heat which ordinarily goes to warm up the ceiling, is utilized to good purpose.

All this benefit is obtainable by the expenditure of an amount of energy (in the fan) which is quite insignificant; and it seems reasonable to suppose that an actual saving would be effected by the adoption of this plan on account of the utilization of a considerable amount of heat which otherwise is of very little practical use. Lacking any definite data one hesitates to estimate what such saving might amount to, but at least it would probably be much more than to counter-balance the cost of the small amount of electric energy required to run the fan. In view of the foregoing it would be a better policy for all concerned if the electrical press would advocate the use of electric fans, during the period when furnaces are in use, rather than of electric heaters. Even with an electric heater a fan will greatly increase the efficiency of distribution of the heat developed and add much to one's personal comfort if one has the patience to wait until a comparatively small heater of, say, 660 or 1,000 watts capacity, has had time to warm up all the air in the average room.

Using fan to raise the temperature

The benefit of this plan will easily be felt on a cool day in about an hour and though the room may feel chilly during the warming up period much greater comfort will be experienced afterwards.

The highest desideratum of any system of heating is to make people feel comfortable, not necessarily to reach any particular temperature and a fan will greatly assist in doing this—Try it!

Yours truly,
A. S. L. Barnes.

High Tension Line from Lake Buntzen to Britannia Beach

Mr. George Kidd, general manager British Columbia Electric Railway Company, announces that his company has entered into an agreement to supply the Britannia Mining & Smelting Company with 4,500 to 6,000 h.p. of electric energy. The power company will start work at once on the construction of a high tension line from its Lake Buntzen generating plant to Britannia Beach, a distance of some 30 miles. The Britannia mine has a 2,735 h.p. plant, but during exceedingly dry weather in summer or cold weather in winter the water supply has sometimes given out; even under normal conditions it is necessary to supplement the water power by steam. The mining company will build its own substation.

Westbury Company Expanding

The Westbury Electric Light & Power Co. of Cookshire, Que., have purchased of Mr. A. G. Hurd, of Sawyerville, Que., the electric light business, including all electrical apparatus, transformers, transmission lines and etc. Mr. Hurd has owned and operated the Sawyerville plant for years.

The Westbury Electric Co. are building a 3,000 volt transmission line from Cookshire to Sawyerville, a distance of six miles, and will supply Sawyerville and Eaton Corner with 24 hour service off their own power plant, situated in Westbury. The company are changing the Sawyerville system from 125 cycles to 60 cycles to correspond with their present system. They expect to have the line in operation early in November.

Commercial Section to be a Strong Part of Canadian Electrical Association

W. O'Brien Elected Vice-Chairman—Subjects for Reports—Special Study of Particular Phases—Appointments Made to Various Bureaus

On Thursday October 26th., at the joint call of Mr. P. J. Davies the president of the Canadian Electrical Association and Mr. L. W. Pratt the chairman of the Commercial Section, an organization meeting of the section was held in the Association's headquarters, 65 McGill College Avenue, Montreal.

Mr. Pratt wired his regret at not being able to be present; Mr. R. B. Cockburn, Canadian Westinghouse Company, Montreal, and Mr. C. F. Barnes, Toronto Niagara Power Company, were also absent. In the absence of the chairman, Mr. P. T. Davies presided.

The meeting was attended by the following members: W. O'Brien, Montreal Light, Heat & Heat Consolidated, Montreal; A. S. Edgar, Canadian General Electric Co. Ltd., Toronto; J. H. O'Hara, Ottawa Electric Company, Ottawa; G. R. Atchison, Southern Canada Power Company, Ltd., Montreal; K. A. McIntyre, Canadian Representative, Society for Electrical Development, New York; P. R. Labelle, Shawinigan Water & Power Co., Montreal, and E. C. McGovern, Northern Electric Company, Limited, Montreal. H. A. Lane, director of the Joint Committee for Business Development, N. E. L. A., New York, and Louis Kon, secretary of the association were also present.

P. T. Davies, President, C.E.A.

Mr. Davies informed the meeting that the executive of the association wished to have the Commercial Section developed into as strong and important a part of the association as the Technical Section is at the present time, and expressed the hope that a great deal of important and valuable work will be done by the various bureaus and committees during the present year. He mentioned also that it is expected to give a considerably larger portion of time during the next convention to the discussion of commercial problems and subjects.

Due to the fact that most of the chairmen of the bureaus and members of the general committee are Montreal men, and the chairman of the section may not be able to call and attend meetings as frequently as may be desirable and necessary, on account of his residing in Hamilton, it was suggested that a vice-chairman be elected, in which Mr. Pratt also concurred. Mr. W. O'Brien was elected vice-chairman.

It was thought that during the year there may be two or three general meetings attended by all the members, besides the meetings of the various bureaus and sub-committees, if such were found to be necessary, which would be arranged for by their respective chairman.

Mr. Davies emphaized the necessity of proceeding with the work of the section immediately and report progress every month in time for the meetings of the executive committee of the association.

The chairmen of the bureaus were asked to choose their own subjects for study and reports to the convention, it being suggested that such subjects as "Increasing Industrial and Domestic Lighting" might be a suitable subject for the report of the Light Sales Bureau. "Spread of Profit in Sales of Appliances" for the Merchandising Sales Bureau. "The Contractor, the Dealer and the Contractor-Dealer as a Factor in Increased and Improved Sales of Illumination and Appliances" for both the bureaus, etc. The discussion of the sections' or bureaus' reports in annual proceedings, which is being mailed to all members, may also suggest some subjects.

The president explained that the purpose of organizing a general committee of the section, which is an innovation introduced this year, was to have a certain number of men closely connected with the section who would undertake to make a special study of particular phases and problems for the existing bureaus or who would take responsibility for organizing such bureau divisions.

W. O'Brien, elected Vice-chairman Commercial Section

Mr. Lane explained the purpose of the joint committee, what it aims to accomplish, and by what means, and expressed his hope that the general committee of the commercial section may eventually become the local Joint Committee for Business Development of the C.E.A.

The Commercial Section, naturally is considered as the channel through which the work of the N. E. L. A. Joint Committee will be carried on.

The following appointments were made to the various Bureaus:

Power Sales Bureau

Chairman, W. O'Brien, Montreal Light, Heat & Power, Montreal; R. P. Labelle, Shawinigan Water & Power Company, Montreal; J. H. O'Hara, Ottawa Electric Company, Ottawa; G. R. Atchison, Southern Canada Power Co. Ltd., Montreal; D. M. Gall, Montreal Light, Heat & Power Cons., Montreal; R. H. Doddridge, Quebec Railway, Lt. Ht. & Power Co., Quebec; P. S. Gregory, Shawinigan Water & Power Company, Montreal; P. T. Davies, Southern Canada Power Co. Ltd., Montreal; L. H. Marrotte, Mtl. Public Service Corporation, Montreal; G. D. Wright, Ottawa Electric Company, Ottawa; W. E. Goring, Hamilton Cataract Power & Light Co., Hamilton; G. Gale, Hull Electric Company, Hull, P. Q.; H. C. Smith, Nova Scotia Tram. & Power Co., Halifax, N. S.; J. M. Robertson, J. M. Robertson & Company, Montreal; J. A. Fletcher, Canadian General Electric Co., Montreal; H. E. Blatch, Canadian Westinghouse Co., Montreal, and W. O. Taylor, Northern Electric Company, Montreal.

Light Sales Bureau

Chairman, J. H. O'Hara, Ottawa Electric Company, Ottawa; Geo. McDougall, McDougall, Pease and Friedman, Montreal; G. J. Beattie, Electrical Contractor, Toronto, Ont.; N. L. Engel, Montreal Public Service Corporation, Montreal; E. D. Fairweather, Southern Canada Power Company, Montreal; L. S. Sach, Montreal Light, Heat & Power Cons., Montreal; G. Newall, B. C. Electric Company, Vancouver, B. C.; F. T. Groome, Holophane Company, Toronto, Ont.; W. J. Orr, Canadian Westinghouse Company, Toronto; (Appointee), Northern Electric Company, Montreal; F. W. Loomis, Canadian General Electric Co., Montreal, and R. M. Love, Canadian General Electric Co., Toronto.

Merchandise Sales Bureau

Chairman, G. R. Atchison, Southern Canada Power, Montreal; C. D. Slimpin, Montreal Light, Heat & Power Cons., Montreal; W. T. Smith, Ottawa Electric Company, Ottawa; (Appointee), Nova Scotia Tramways & Power Co., Halifax, N. S.; H. Warren, North Shore Power Co., Three Rivers, P. Q.; Mr. Walker, B. C. Electric Company, Vancouver, B. C.; A. S. Edgar, Canadian General Electric Co. Ltd., Toronto; E. G. McGovern, Northern Electric Co. Ltd., Montreal; R. B. Cockburn, Canadian Westinghouse Co., Montreal; L. A. Mace, Can'n. Comstock Company, Ltd., Montreal; F. D. Baker, Household Equipment Co., Montreal; D. F. Streb, Electric Shop, Saskatoon, Sask.; H. C. Hall, The Electric Shop, Moose Jaw, Aa.; G. W. Hillas, Hillas Electric Co., Edmonton, Alta.; J. H. Schumacher, Schumacher-Gray Company, Winnipeg, Man., and E. W. Beard, Budden-Beard Company, Calgary, Alta.

Commercial Service Relations with Customers

Chairman, C. T. Barnes, Toronto & Niagara Power Co., Toronto; J. A. Beaudin, Montreal Light, Heat & Power Co., Montreal, and H. T. Anscombe, Ottawa Electric Company, Ottawa.

Mr. R. P. Labelle was appointed to represent the C. E. A. on the Joint Committee for Business Development, N. E. L. A.; Mr. A. S. Edgar, Canadian General Electric Company, Toronto, to represent the Section on the Salesman's Hand Book Committee, and Mr. D. M. Gall, Montreal Light, Heat & Power Company, to represent the Section on the Electric Vehicle Bureau, to correspond with the two above mentioned in the N. E. L. A., which will be organized in the C. E. A. for the present year.

A Large Transformer Order—200 Distribution Type to be Exported

The Ferranti Meter and Manufacturing Company, Toronto, have just closed what is said to be the largest order for transformers ever placed in Canada, for export. The Southland Power Board of Invercargill, New Zealand, has placed an order with this Canadian company for 200 distribution type transformers, three phase, 11,000 volts, in five, ten, fifteen, twenty and thirty kv.a. sizes. The transformers will be designed for fifty cycle circuits, and will be delta connected on the high tension side and star connected to the low tension winding.

This order is of special interest and satisfaction to the Canadian electrical industry in that it was obtained in competition with German, Swedish, English and United States firms. Not only that, but the order was placed on a quality, and not a price, basis the competing tenders being lower than the Canadian firm's figures. The Ferranti Company submitted with their tender a sample transformer built to the New Zealand specifications and we understand the award was largely influenced by the details of transformer construction, coil impregnation and the welded steel tanks.

This order furnishes food for thought for all Canadian manufacturers. Perhaps we are too much inclined to underrate our own ability in world competition. Perhaps after all in our quiet, thorough way we really do turn out better products than they do in the United States or in Europe, or even in the Old Mother Land. This order should encourage us to have more confidence in our own ability to produce goods that will meet the competition of world manufacturers where ever it may be encountered.

Hardening Old Street Railway Rails

A process of rail-hardening is being undertaken by the Toronto Transportation Commission, designed to improve the condition of old rails without lifting them out of position. It is called the Sandberg sorbitic treatment and consists of applying a flame to the top of the rail, this flame traveling slowly along the surface and being followed by the application of a water jet for cooling. The process has not been previously used in the United States or Canada, but has been successfully tried out in a number of English cities, where accurate rail measurements indicate that the life of the rail is prolonged two or three times. It is also claimed that corrugation is prevented by the flame treatment; that is; the rail will not become rough and "bumpy" with use. The hardening process affects the rail to a depth of as much as one-quarter of an inch. The machine treats 180 feet of single track (360 feet of rail) in 12 hours. It is intended to deal with one mile this fall, and an additional mileage next year.

Completion of French High-Power Station

A successful test of the new French high power station at St. Assise, Department of Seine et Marne, was recently made with the United States. This station has been in course of construction for the past two years and will shortly be opened to public traffic with America.

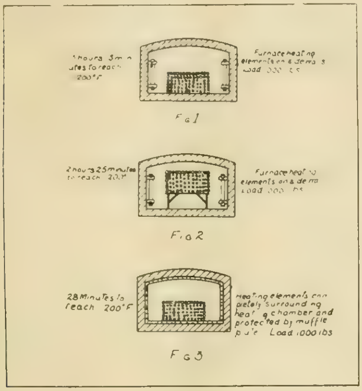
The Standard Electric Crane & Hoist Co., Philadelphia, announce that they have just made arrangements with the Lyman Tube & Supply Co., Ltd., Montreal, to represent them as their exclusive agents in the Dominion of Canada.

Design of an Electric Furnace For The Heat Treatment of Steel

Requirements Included Ability to Heat 5,000 Pounds Steel to 1650 Degrees F.—Necessary to Liberate Heat as Fast as Charge Could Absorb It—Nickel Chromium Elements Used

By A. W. LAMONT, Assistant manager,
Canadian Westinghouse Co., Winnipeg*

Large industrial electric heat treating furnaces reached a high state of development during the war and today their status compares favorably to the electric motor fifteen years ago, both as to connected load and apparatus available. Sufficient installations for heat treating have already been made to demonstrate conclusively that increased productions, better quality of product and lower operating result than from other types of furnaces.



Elevation sections showing development of Electric Furnace

The Transcona Furnace

The early type of electric furnace was constructed on the principle shown in Fig. 1. The length of time required to bring the entire load to a uniform predetermined temperature in a furnace of this design was found to be excessive and later on the principle shown in Fig. 2 was employed with the encouraging results as shown. The most recent development in the arrangement of the heating coils is shown in Fig. 3, and this arrangement is followed out in the Transcona installation.

The work for which the Transcona Furnace was designed consisted of heating 5,000 lbs. of locomotive side rods and main rods from room temperature to 1,650 deg. F. and it was desired to construct the furnace bottom on a car so that the charge could be rolled in and withdrawn on the car.

In order to make the furnace of maximum efficiency, all things considered, it was necessary to liberate heat therein just as fast as the charge could absorb it and also to insulate it so that a minimum of heat would be lost by radiation. The total heating element capacity desirable after considering the above was determined at 220 kw. and the radiation losses at 1,650 deg. F. were estimated at 48 kw. giving a thermal efficiency at that temperature of 80%.

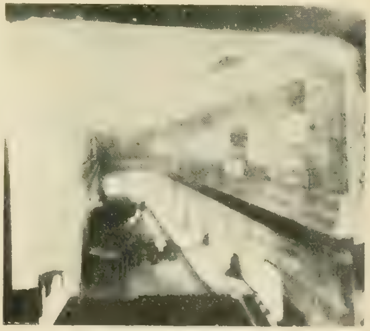
Nickel Chromium Heating Elements

The best commercial element yet developed for furnaces of this type is pure nickel chromium wire which is practically non-oxidizing up to a temperature of 2,000 deg. F. The question of prime importance is to keep oxidation down to a minimum. A round wire was therefore chosen as the surface exposed to oxidation is a minimum. The size of the wire used is made as large as is commercially feasible for the following reason. If you increase the diameter of a round wire so that the weight is doubled there is only an increase of 41.6 per cent of oxidizing area.. From the above considerations No. 1 B & S round wire was chosen for the furnace under discussion and each heating unit was made interchangeable, consisting of six bars, each approximately 7 feet long, with No. 3/0 B.S. wire of the same composition butt welded to each end for terminals.

There are twenty-four of these coils in the top and sides of the furnace. Each group of twelve coils is connected to give a balanced load on 180 volts three phase, 4 coils being connected in series. In the car bottom there are twelve coils divided into two groups, one for each compartment, and they give a balanced load on 90 volts three phase, two coils being connected in series on each phase.

Special Muffle Plates

The coils in the car bottom are held in place by the grooves in the muffle plates which cover them over. Over the top of these muffle plates a floor of cast non-oxidizing ribbed plates is laid. The floor plates rest on supporting fire brick shapes and do not allow any load to rest on the muffle plates of the heating units. The muffle plates are a special combination of earths having a thermal conductivity twenty times that of alundum and having a high dielectric strength at furnace temperatures. These plates serve not only to protect the element wire from injury or short circuit but also distribute the heat uniformly over the entire inner surface of the furnace. The muffle plates also help



Interior of the Furnace

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*Abstract from paper before E.I.C., Winnipeg.

to exclude a large portion of the oxidizing atmosphere of the furnace from the element wire thus reducing the oxidizing effect on the wire.

Uniform Temperature Automatically Obtained

In the design of the furnace in question it was desirable that a uniform pre determined temperature be maintained automatically throughout the period that the material was absorbing the heat after this temperature of the furnace had been reached. In order to accomplish this two thermo couples were inserted in the furnace, connected to a Leeds and Northrup graphic recording pyrometer having two point control. These controls, through suitable relays, operate magnetic contactors. When the temperature of the furnace tends to rise above the setting of the instrument, the heating circuit is opened and when the temperature tends to fall below this value it is again closed. A uniform temperature within 1/2 of 1% can be maintained with this equipment.

Operation of the Furnace

In one instance a charge of approximately 6,000 lbs. of locomotive side rods and main rods were placed in the furnace at 8.10 a.m. At 1.00 p.m. the furnace had reached the pre-determined normalizing temperature of 1,200 deg. F. and the pyrometer which had previously been set to operate at this temperature operated the relays. This is turn caused the magnetic contactors to open and drop the load. At this time however the charge had not absorbed sufficient heat to soak it to the centre of each rod.

In approximately five minutes the charge had absorbed sufficient heat to reduce the furnace temperature six degrees and the pyrometer again caused the load to be thrown on. This cycle of operation was contained until the charge had completely soaked at the pre-determined temperature.

As soon as the kw. input balanced with the known radiation losses of the furnace it was then clear that the charge was not absorbing further heat.

The pyrometer and main switch were then opened and the current entirely disconnected. The furnace was allowed to cool until its temperature had reached 1,000 deg. F. and then the charge was drawn. This cooling is necessary before the door of the furnace is opened as the rods would oxidize if drawn at a higher temperature.

Resilient Ties Used on Rehabilitation Trackwork by Winnipeg Electric Railway Company

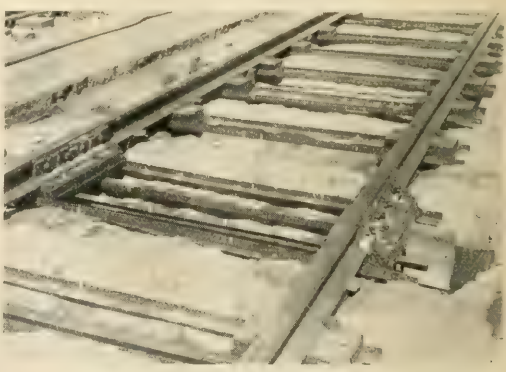
In the city of Winnipeg, Man., the Winnipeg Electric Railway Company has been carrying out in the last two or three years, an extensive rehabilitation programme. One of the most important pieces of this work but recently completed, is that on Main street, north, where, for an extent of 0.8 miles, the company has relaid the double tracks.

The type of construction followed was that of a heavier rail used in conjunction with the Dayton mechanical resilient tie. Before adopting this type of road-bed, the company gave the matter careful consideration, as the nature of the sub-soil in Winnipeg presents many and serious problems in the constructing of street car tracks. After much research, the company's Maintenance of Way Department came to the conclusion that the Dayton resilient tie was the proper tie to use in Winnipeg, as it afforded the opportunity to get away from the rigid type of track construction standardized in the past.

Spading concrete around ties

About 1,500 ties were used in this work and were placed in position with great facility. After lifting the old tracks it was found that the existing road-bed was in good condition and the company was able to use it as the foundation for this new work. By the adoption of these ties, a large saving in money was entailed in the fact that not so much excavation for depth of concrete was required as in previous methods of construction, nor was the work of installing these ties as great.

The company stands as the pioneer of this cushion-like construction in the Dominion of Canada, and is confident that the outcome of its adoption, together with certain standards of its own, will give entire satisfaction. The accompanying illustrations convey a very good idea of the procedure of the work. The work was carried out under the supervision of Mr. S. Wilkins, engineer of Maintenance of Way and Structures.



Completed track at joint tie ready for concrete

BETTER MERCHANDISING

Why Weren't the Contractor-Dealers Present?

The big Contractor-Dealers' Convention is over.

The members of the committee—some of them—worked like heroes.

The total attendance was highly satisfactory—around three hundred.

The programme was unusually valuable from the contractor-dealers' view point—it represented years of intimate experience with merchandising.

There was just one fly in the ointment—**the contractor-dealers were not present.**

Why didn't the contractor-dealer attend?

Frankly, we don't know.

Was it an inconvenient date?

Was the programme not to his liking?

Was the personnel of the committee not acceptable?

Did it cost too much?

The men who worked hardest to make this convention a success are the most discouraged. Who will offer a solution of the lack of contractor-dealer interest? If any of our readers will commit themselves to paper—anonymously or otherwise—we'll print it, in the hope of reaching an answer to a difficult question.

Ben Socket Attended the Convention

His Comments on the Proceedings are Somewhat Caustic, Especially Regarding the Absence of Contractor-Dealers

Bytown, Nov. 20/22

Dear Mr. Editor,

It is almost three months since I have written you, and I am sure you and your readers must have thought that Ben Socket was spending his vacation at a seashore, followed by a prolonged rest in the mountains and preparations to spend part of the winter in Bermuda, and that Plug was out of business, and therefore, I had nothing to write to you about.

No Mr. Editor, Socket is gradually pulling himself up and Plug continues to make rounds of the jobbers, forfeiting his credit in one jobbing house after the other; Ben says he is pretty close to the end of the rope. As soon as he has stung the last jobber he will be no more an "Electrical Contractor."

I had nearly finished a letter telling you of my personal experiences in trying to buy some electrical appliances, but Socket has just returned from a Contractor-Dealers Convention in Toronto, and I have overheard so many amusing incidents in his chat with my husband, that I have decided to share them with you.

Had to Attend the Convention

Toward the end of last week Socket asked my husband for a small and short loan, as he had to make a fairly heavy expense for a trip to a Convention; he came to our home after supper to get the money and I so much enjoyed listening to his story of the convention that I have decided to write to you about it.

Ben Socket believed in conventions

There may be certain parts of his story that he might not wish to have repeated, but they are too good not to be passed on to others; besides, as you know Mr. Editor, we women, although we greatly dislike to have any stories told about ourselves, do not mind a bit telling other people's stories.

I hope Ben will not get angry with me, and I hope that the electrical contractors will read his viewpoint, quite carefully.

My husband expressed to Socket his satisfaction at his going to a Convention held some distance away from his home; he was sure that is was not the customary banquet that prompted him to go. We suspected as the main reason of his going the awakening of a greater ambition. Our surmise was quite borne oue.

"Well" said Ben, on his return, "I wanted to find out how far behind I was in comparison with the organized and wide-awake contractors and dealers where they have been at this organization work for a number of years and where they have more favorable conditions and get, probably, more support in conducting their business in a business-like manner than elsewhere in Canada; I wanted to improve myself by listening to the speakers at the Convention, but above all, I was afraid to be taken for a "dead one" beyond possibilities of revival.

"The plans of the Convention Committee and the campaign for attendance at the convention were very vigorously carried on for weeks, with every body's assistance, culminated in a strong appeal by the electrical trade paper to be on hand or to be put on the disgrace list of the dead ones.

"I believed it would be, in fact, a census taking of the electrical contractors of Canada, or at least of the Province of Ontario; those present to be recorded as live ones and the rest as dead ones."

"And how was the Convention" my husband asked impatiently anticipating a very interesting story.

Ben Shifted his Chair

Ben shifted his chair, looked around as if afraid of the presence of someone not wanted, and finally with his characteristic "Oh hell!" delivered himself of the following story:

"How was the Convention? Well, from the point of view of attendance of electrical contractors and dealers it was just about like the beer they have in Toronto, about 2-1/2%.

"As soon as I registered my name, to be sure that I would get a seat and handed over a few bones as a sign of good faith on my part, I got a badge which let everybody know that I was attending the Electrical Contractors' and Dealers "Convention."

"We went to have breakfast in a cafeteria; it was here that I got the first proof of the confidence people of Toronto have in us fellows.

"I placed all my eats on the tray and when I got to what I thought to be a cashier, but who proved to be the credit manager, I got just a slip of paper with total and itemized cost of every article.

"Naturally, by habit, I pulled some money out of my pocket, but the girl just smiled and looking at my badge said: Pay as you go out.

"It certainly made me feel big to be trusted with a square meal like that.

"I forgot to tell you that the Convention was held in the King Edward, Toronto's finest hotel; the next one may have to take place in the Home for Incurables.

Ice Water 'Neverything

"At twelve forty-five we had a fine luncheon. It was certainly a fine and enjoyable meal; good food, plenty of music, singing and ice water; every body was happy and looking around to see if there were any contractors and dealers present.

Frank Groome exposed wrong methods of lighting

"After lunch all were asked to assemble in the Pompeian Room to listen to five short but splendid addresses on selling electrical fixtures, washing-machines, ranges, suction sweepers and good lighting.

"Frank Groome—you must know Frank Groome; everybody knows him— was the chairman of the meeting and the speaker on the last mentioned subject.

Store Window Exhibits

"There was a very fine exhibit of two store windows put on by the C.G.E. to suggest to the dealers proper illumination and attractive display.

"One of them showed the evolution of the lamp since artificial light first became known; it was a most interesting and educative display.

"It is wonderful what progress illumination has made, soliloquized Ben, but it is most astonishing how very few rays are penetrating into the business methods of the electrical contractors and dealers.

Tom Kelly uses short sentences in selling cleaners

"Of course these short addresses contained most helpful hints to any contractor and dealer on how to handle and to improve his business, but again there were hardly any contractors and dealers present to take advantage of this seed purposely scattered in such a form as to make it germinate in the most barren soil.

"There was a good attendance of jobbers and manufacturers' representatives, of the trade and newspaper men, professional organizers, central station men, but those for whom the convention was meant, and who need the education, were not there.

Good Salesmanship

"Tom. Kelly, of the Hoover Company, used a most effective and appropriate method of explaining the elements of good salesmanship—he used short salesmanship sentences displayed before his listeners in bold type on large sheets of paper, supplementing each by his own tersely worded emphasis or actual experiences in following that method of salesmanship.

"Joe. Heffron gave a dandy talk on selling fixtures and Mr. Fox—I forgot his first name, but he sells "National" goods—told how to sell ranges. I wouldn't like to meet that fellow Fox if I hadn't the money to buy an Electric range. F. S. Babcock, of Easy Washer fame showed us how to sell more washers.

"The last talk of that afternoon was given by Frank Groome. It was'nt a honeymoon trip into the realm of illumination, as far as Mr. Groome was concerned. He gave many valuable explanations and suggestions gathered in his active and successful years of selling better lighting, and he exposed the wrong methods employed so frequently by the contractors and dealers.

"Good thing that it was not scheduled as a revival meeting and that Frank did not call for sinners.

Joe Heffron illustrated best methods of selling fixtures

"A chap next to me, one of the two and a half per cent, told me that recently he was asked a price for changing lighting in a church.

"It was'nt a case of his own initiative and an attempt to increase his business through suggesting to the church wardens that collections could be increased if everyone in the congregation could see what size of coin is being put on the collection plate, but a case of the congregation not being able to read the hymn books on account of poor illumination.

"He inspected the church and instead of submitting a price he suggested to the wardens to spend about one hundred and fifty dollars on new hymn books with larger type because, to improve their illumination, it would cost almost three or four hundred dollars.

My husband flung his paper on the floor and with a mighty "Great scott" remarked that he would like to have a look at that fellow, though he would not care to be near him.

He wondered "if a tinsmith who may be asked to state the cost of fixing a leaking roof would suggest buying umbrellas and rubber boots as it might be cheaper."

But, It Was Worth It

I insisted on Ben continuing his story of the Convention without interruptions from my husband, who actually began to think that after all Socket was not such a hopeless case as he had always believed him to be.

"Now, let's see," he began again recalling where he stopped at, and; "Oh yes, there was a banquet that night on the seventeenth floor.

Dr. Cameron, a brilliant preacher, spoke on Idealism in Business

"Too high you say?

"Wait till you hear the price.

"But it was worth it.

"One of the most pleasing features of the banquet was the fact that no man in the electrical industry thought himself too big to be present. The biggest and most prominent men among the officials of the power stations, manufacturers and jobbers were there. They all are willing and anxious to assist the contractors and dealers to improve their business and their methods of doing business.

"The menu was fine from soup to nuts; besides which there were also Brazils, one of them half shelled, contributing to the enjoyment of the evening by good singing and general hilarity, despite the fact that the toasts were run on dry batteries.

"Mr. Ellis, the chairman of the Toronto Hydro Commission spoke most interestingly, and at length, of the accomplishments of the Hydro since its inception and the potential possibilities of its future; there might have been some anxiety felt by the contractors present lest they be absorbed as well, though I do not fear it; the Hydro, as a rule take only the things worth while taking.

"Dr. Cameron, a brilliant preacher, spoke most enthusiastically of idealism in business. Momentary interruptions of his most inspiring address by occasional misbehavior of certain groups were effectively stopped by the chairman, Mr. Harry Hicks.

"The next day we again had an enjoyable luncheon and most profitable fore and afternoon sessions.

Poor Attendance of Contractor-Dealer

"However, it was another case of not "Where is my boy to-night," but "Where are our contractors and dealers today."

"One had to ask himself, looking over the audience, "Why is it called a contractors and dealers convention?" Why in the name of common sense were not those present who need so badly, for their own sake more than for the sake of the rest of the industry, the very kind of education that was so ably prepared for them; education which they must acquire if they do not wish to be crowded out of business and supplanted by men who are capable and willing to be good tradesmen and business men fit to be assimilated, instead of becoming an indigestible lump in the young and vigorous organism of the electrical industry.

"Sam Hibben of the Westinghouse Company from New York gave a most admirable scientific but popularly worded paper on "What is illumination—its effects and advantages," supplemented by very interesting demonstrations; information which is very little known to most of our contractors who are supposed to be building up their business through the sale of more and better lighting.

"Gordon McLaren, president of the Ontario Jewellers' Association gave us a most interesting parallel between the conditions in his line of business and those of an electrical contractor dealer, particularly in reference to the keeping of a store.

Co-operative Advertising

"He explained their advertising schemes of which he particularly commended, as productive of results, local co-operative advertising campaigns, assuring us that their periodically and consistently appearing stories in the daily press on why people should buy lasting gifts of jewellers had a very stimulating effect on improving sales; he also stated that in the jewelry business there is a certain number of men who are not and never will be business men. This type undoubtely will soon have to disappear from the field. Listening to him one had to admit what poor salesmen we electrical dealers are, if we cannot succeed in selling appliances that are not only a decoration but every day necessity, health and labor saving devices, compared with the jewellers who sell broaches and trinkets only by using as their appeal 'Buy lasting gifts' and by persuading people that wrists, ears and fingers were given to human beings by nature merely to wear wrist watches, ear rings and rings.

The Fellow Who Does The Figuring

"Service-Henderson of Brantford, the fellow who does the figuring for the Canadian electrical contractors, spoke on financing business.

"I felt very uneasy while he talked. It seemed to me that everybody present was looking at me while he was explaining the way most electrical contractors figure their jobs and keep their accounts.

President Harry Hicks bought a swanky overcoat for the occasion

Of course he did not mean me personally, but my conscience-meter was registering very fast.

"Some fellows perhaps thought he was trying to make profiteers of electrical contractors with his insistence about charging rent against the overhead expense even if you owned the building and had no rent to pay, or the upkeep and running of a car, though it be a Ford.

"His explanations on what the contractors and dealers are doing to themselves and to their business by not using business methods and where it is and will continue to land them, was almost parallel to the case of the negro woman who came to work one morning full of tears, giving as the cause of her grief, the death of her husband. "And did you have a doctor?" she was asked, "No, he died without anybody's help."

Not Much to Say About It

While in Toronto, I studied the window displays of the contractors and dealers, expecting to see, on the occasion of their own Convention, at least an attempt to show pride and interest in their own business, but there is not much to say about it.

"You may think that I do not appreciate a Convention, but I do; I am glad that I went; I have learned a lot and I am encouraged, feeling that I am not as dead as some are. Besides I know now, if we have a convention in our little town, whom to ask us to put it across; Charlie Hopper will surely be approached to handle the job, because he knows how to arrange it and how to choose the right kind of fellows to help in making a convention a success.

"I am also convinced now that frequent 'extension courses' on wiring, illumination, sale of appliances, cost accounting bookkeeping as they had it in Toronto during the Convention is what will help to put us on our feet and will teach those of us who are teachable to be what the public and the rest of the industry expect to be."

This is Ben Socket's story of the convention; from now on I shall watch Ben closer still than I have done, to see if it is an artificial inspiration carried away from the Convention or some lasting benefit.

And I will share my observations with you, Mr. Editor.

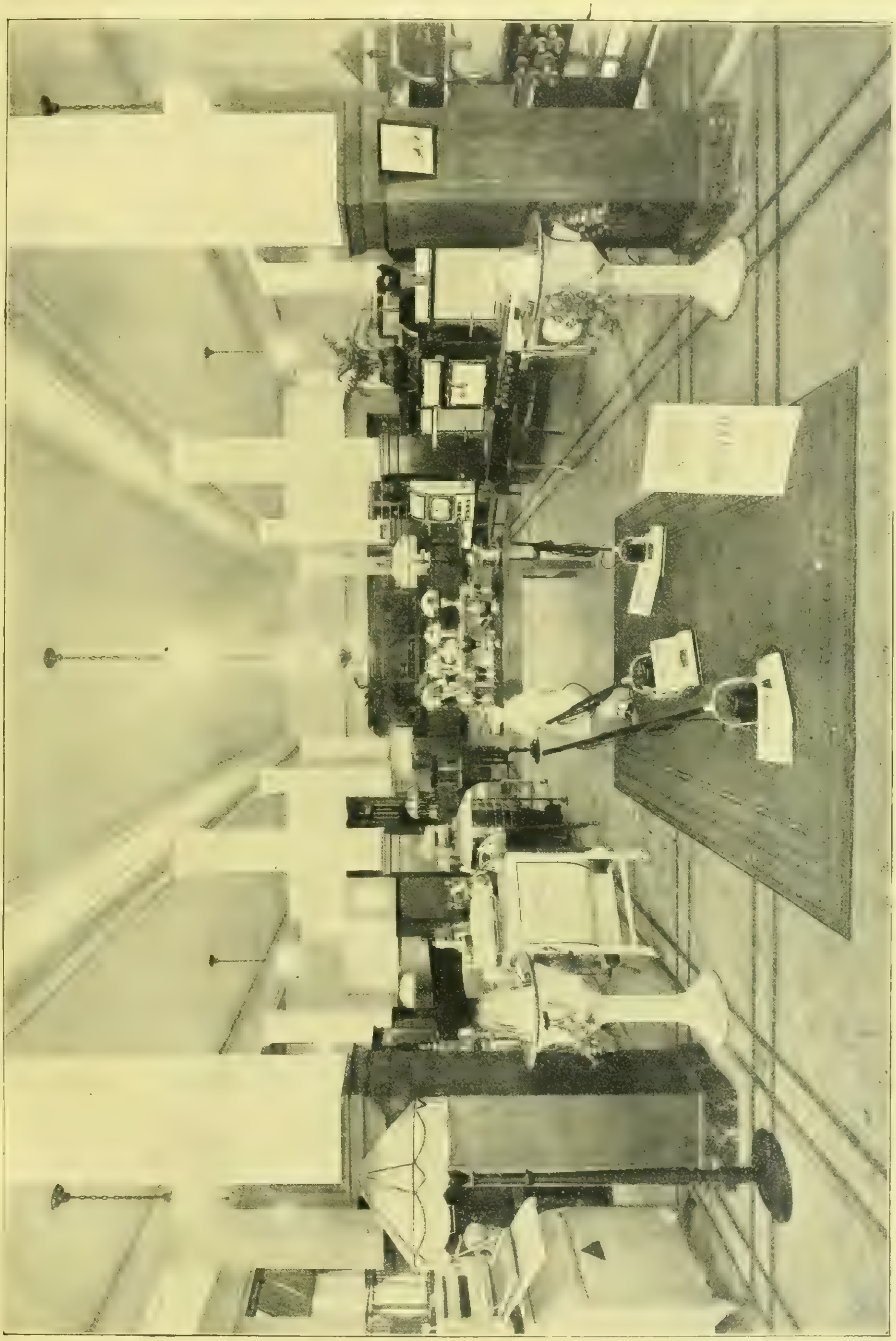
Yours very truly,
I. M. Buyer.

December 11th to 16th—Hoover Week

According to an announcement by the Hoover Suction Sweeper Company of North Canton, Ohio, December 11th to 16th, 1922, has been designated as the time for their annual Hoover Week. During the past, Hoover Week has always had the active support of Hoover dealers and it is expected that this year's event will bring forth both more enthusiasm and greater results. As usual, a feature of Hoover Week will be the window display contest which is always earnestly participated in by dealers. To make it even more attractive for the dealer to enter this year's contest the number of major cash prizes has been doubled. In addition there are thirty smaller prizes. Hoover Week is being brought to the attention of the general public by national magazine advertising in December issues. This publicity will tie-up advantageously with the special efforts of dealers during the event. Special display material and literature are also being supplied by the Hoover Company.

The Mechanics Supply Co., Quebec

Among the large electrical enterprises in Canada, the name of the Mechanics Supply Co., Limited, Quebec, occupies a prominent place, and their extensive premises in the wholesale business district of that city has become a well recognized centre for the distribution of everything pertaining to the electrical and mechanical arts. In our Nov. 15 issue we drew the attention of our readers to this large organization which Mr. W. H. Wiggs, its president, has built up since the year 1889 when he first established this business in his native city.



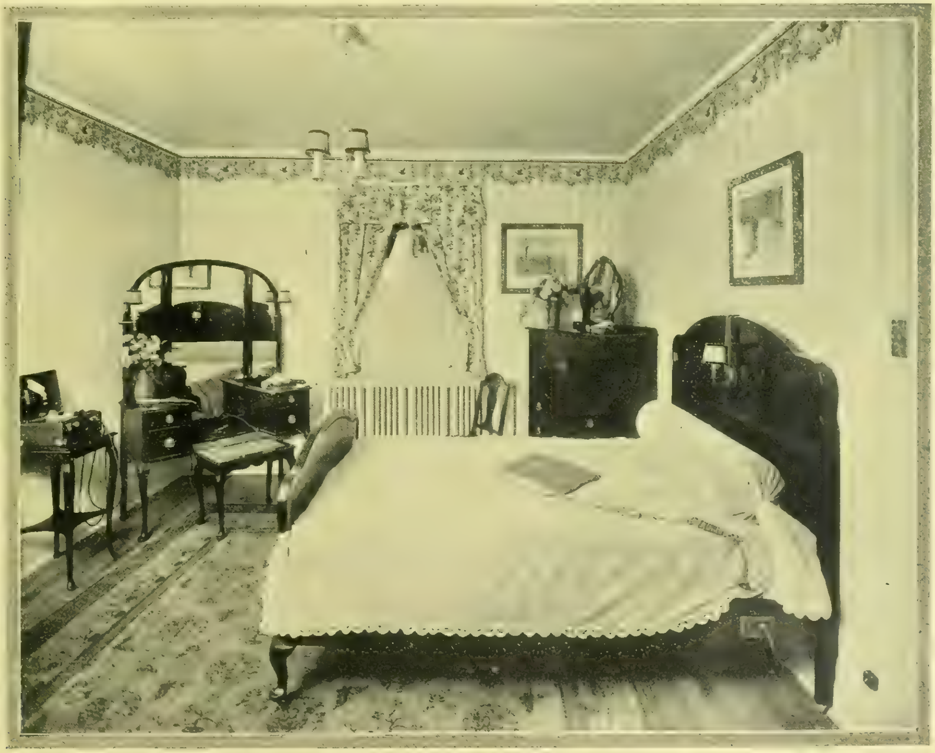
Appliance Show Room of the Winnipeg Hydro-electric System

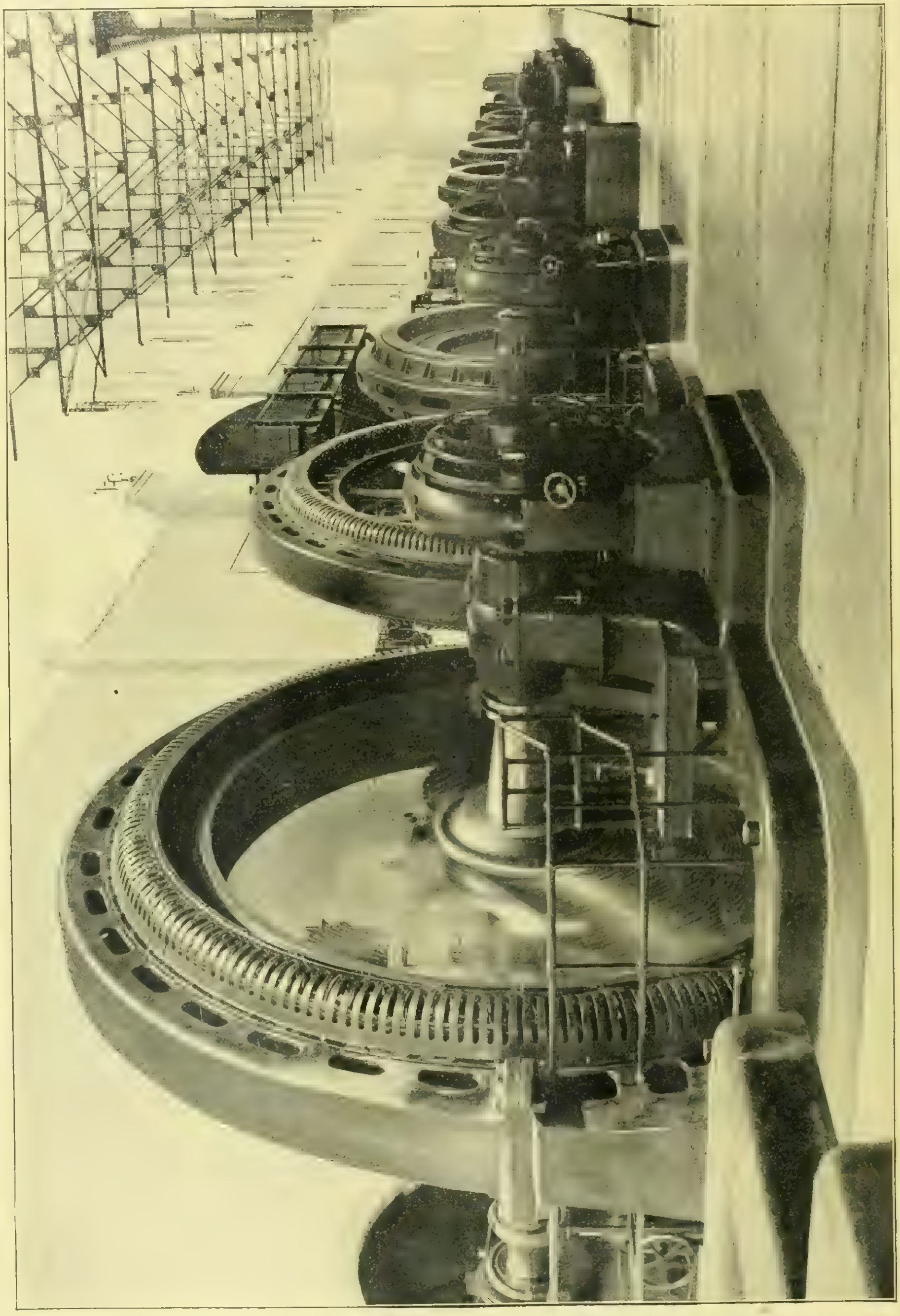
These attractive offices and show rooms of the Toronto Hydro-electric System are situated in the new Public Utilities
appliances. The underlying idea in opening this show room is to

The Electrical Co-operative Association of the Province of Quebec recently held an Electric Home Exhibit, which was attended by 30,000 interested citizens. Two views of this home are shown herewith. Note the wiring of the furniture.

Building at the corner of Yonge and Front streets. Attractive surroundings enhance the appearance of electrical demonstrate the value of electrical appliances, rather than to sell them

On the left observe the wiring of the dining room table, and the afternoon tea table. On the right the bed is equipped with a duplex outlet. Base and wall outlets in sufficient number were also installed in this home, in all the rooms.





A fine view of the Generating Station of the Winnipeg Hydro-electric System at Point du Bois on the Winnipeg River

Expert Jeweler Explains To Electrical Dealers

Elementary Principles of Merchandising

Gordon McLaren of Hamilton, President of the Canadian Jewelers' Association, Tells Electrical Merchants how to Carry on at a Profit

It seems to me that there is quite a similarity between the electrical business and the jewellery business, inasmuch as the mechanical phase of it is an important factor in each instance. We have in our business watchmakers. They are mechanical men; they do not understand merchandising. They may start in business for themselves with a small stock, but generally speaking, they are not merchants, and know nothing about the running of a business. You likewise have mechanics who are working on your contracts; they are not merchants and are ignorant of business principles.

If you, a contractor-dealer, leave the store, to close a contract, perhaps your mechanics may, in your absence, pick up various items that they need on their jobs, without leaving any record. This will result in serious shortages and upset your calculations. The plan we have in our own store is to have every article on the premises numbered. Each item is recorded in our stock book. We use a sales-slip, and nothing is allowed to leave the store without being recorded on the slip, of which a duplicate is kept. Each morning a young woman checks up the transactions of the previous day and fills in the records and we are thus provided with what amounts to a perpetual inventory. At the end of each month, we receive a report from the auditor on each department, showing how the stock at the first of the month, the goods bought during the month, what is left on hand, and the gross profit.

Repair Department a Necessary Evil

In our business, we regard the repair department as a necessary evil. There is no money in it. The watchmaker will spend perhaps half an hour talking about some repair to a watch or a piece of jewellery, and will leave a good prospective customer for new business standing waiting in the meanwhile. Perhaps you are up against something of the same kind in your line. Certainly you cannot overlook the importance of service in this connection. People expect to go into a retail electric store and have you tell them right away what is the matter with their sweeper. Of course you can put it up to the manufacturer, but your customer won't want to wait. She's ready to clean house. You're the man she bought the machine from and you're the man she wants to fix it—and that without delay. With us, it is quite possible in the matter of a 50 cent repair job, on which we don't make anything anyway, to give some causes for dissatisfaction which will drive away an excellent prospective purchaser of our merchandise and prevent him, or her, from ever entering the store again.

Service

"Service" is a very large subject in itself and this, combined with "stock-keeping" is mainly what I would have you consider with me today. These two branches are very closely connected, as service in the strict sense of the term cannot be successfully given unless backed up by proper stock-keeping.

Straightforward dealing with your customers even to the amount of a penny is essential for three reasons. First—because it is the right thing to do. Second—because your business cannot successfully function and continue without it. Third—because you can't possibly be associated with your staff day after day without them absorbing the principles and practices by which you run your business.

You are an example to your staff. If bad, their training will be bad and before long will react on you. If the example be good you will at once command the respect of your staff and they will endeavor to emulate it and here, right at the start, you have the confidence and co-operation of your force, be it few or many. Without this confidence and co-operation your business is handicapped as you are endeavoring to pull the whole load single handed against opposition.

Keep in touch with your staff. Be friendly, but not familiar. Make them feel free to discuss an idea for improvement, or pass an opinion on something that is not in best interests of progress in your system or store management.

Keep Close to Your Staff

These are things that make the employer respected by the staff, not simply because of your superior knowledge of things in general. You can't know it all or keep your fingers on all the requirements and details of the business. Be interested in suggestions from your staff. They may not always be as good as your own, but at least they show an effort to help. The staff will have the solution of a problem before you even recognize that a problem exists. Shift your responsibility when and wherever you can. Make your staff self dependent. Make them feel that they are an important link in your organization and that if they fail in their obligations the whole business system feels the effect.

Smile, if it hurts every muscle in your face

The Value of a Smile

In receiving your prospective buyer or customer, first **Smile**—smile if it hurts every muscle in your face. Don't giggle or laugh, just smile and make a mental note of how many smiles you will receive in return. This is the most valuable asset by way of an introduction that you can possibly possess.

Now you and your client are at ease and ready to talk business. Of course some people never smile back. Most of them do. Try it and see.

Next, be all interest and attention to hear your customer's request and endeavor to "get it" the first time without asking them to repeat.

Keep Stock Clean and Bright

Stock that is kept clean and bright and in saleable condition is just as apt to sell as some new pieces a week old. Go over your stock systematically so that it is always in shape for inspection. This also will hide the age of some of the pieces on your shelves for if they are bright and shining you will be the only one who knows how many birthdays they have celebrated.

Am I justified in emphasizing stock—in other words emphasizing old stock? Emphatically yes. Who said it was old? Only you or your clerks, as I said before, who have been associated with it until you have tired of it.

Don't Urge Your Own Preference

Quality and value are what you as a merchant must give your clients. Design? Style? Most people have, or like to feel they have, the power to make a decision on their own account and I would warn you who are salesmen to not be over-zealous in persisting to give prominence to the articles in stock which yourself would choose. In most cases your opinion would not be appreciated and you would likely lose a sale. If you are clever and impressive enough to make the sale, there will in all probability be a comeback, or worse still a dissatisfied customer who feels he was sold something he did not really like and who vows he will never go near that store again.

On the other hand you must not be too reserved and stingy with advice. If your client desires assistance and suggestion, give it freely but discreetly. Watch every expression on your customer's face. Note the frequency with which he refers to, or asks questions regarding, one particular article. Follow the trend of his thoughts as nearly as possible.

Be all intent on the finding of a suitable article for this particular person, no matter how many or how few the dollars involved.

No Trouble to Show Goods

Believe, from the time you approach your customer, that he has come in to buy. Don't worry too much about the results of your efforts to close a sale and get the money, important as it may be, thus forgetting your treatment, courtesy and effort, which will go a long way in making an impression. This impression will in all probability remain uppermost in your customer's mind, even while inspecting competing stocks. Prove your ability to live up to the much hackneyed phrase "no trouble to show goods" especially if you advertise it. Send your customer out of your store with a pleasant "good-day" and an invitation to return. Have him leave with a good taste in his mouth and the assurance that you have expended your best efforts to serve him.

I am dwelling upon this, because I believe it is just where most of us fall down in our service. You know people don't **have** to come into your store or mine, unless we make it as easy as possible and as pleasant as possible for them to obtain the information they seek. If you are feeling bilious, endeavor to hide it. If you are worried don't show it in your expression or demeanor. It is in accord with human nature for prospective customers to be susceptible, if the proper sort of treatment is tendered them. It is equally in accord with human nature for them to be reserved and disinterested in you and your goods, if you are not courteous, civil, painstaking and zealous in your efforts to supply the information desired.

Questions

Following Mr. McLaren's address, a number of questions were asked.

Question: If a fellow comes into your store on a Saturday night looking for a battery for his flashlight. You hand him the battery and when he slips it into the case it doesn't light up right off the bat. He then expects you to stand and make whatever little adjustments are necessary, while a number of other customers are waiting to be served. How would you handle a situation like that?

Answer: We are all up against propositions like that. In our case, for instance, the largest crowd of the day may happen to gather in the store around noon time, when 50 per cent of our staff are out having luncheon. And when fellows come in like that at the last minute of the twelfth hour on Saturday night, you simply can't give all the service that is demanded. The best you can do is to try and avoid offending anyone and wait on three customers at once.

Fixed Prices?

Question: Are there fixed prices in the jewelery business, and if so what is the percentage of profit?

Answer: At present, Mr. Raney, the attorney-general, is advocating the abolition of fixed prices, while the executive of our association is going on record as approving of fixed prices. We have appealed to Mr. Raney by letter, and at the same time we are going to make a personal appeal. At our last executive meeting, the matter came up of a store in which "Big Bens" were being sold at half price. Letters were read from a number of manufacturers in competing lines and retailers, who had communicated with the "Big Ben" people and had been unable to get any satisfaction. The contention is, on the manufacturer's part, that if he fixes prices it will interfere with the volume of business he can do. Druggests, hardware merchants and others, are handling such lines as "Big Bens" merely as a bait to get people into their premises and without figuring any profit on them. Again, the wholesalers in many instances are against the fixed price. One large wholesaler stated recently that his overhead had increased to such an extent that the mark-up allowed by the manufacturers did not provide a sufficient margin of profit. They therefore want to be allowed to ask what price they like.

I WANT THAT CLEANER FIXED AT ONCE, PLEASE!

Service is a very large subject

Overhead Percentage

Question: Have you compiled figures on overhead in the merchandising of jewelery?

Answer: The best authority on the matter is the Bureau of Business Research of Harvard University. They have made an investigation for several years and worked out averages covering a number of stores. For 1919, the average percentage of selling expense on gross sales was placed at 32.7; in 1920, 37.5 per cent; 1921, 39.4 per cent. Overhead has increased considerably and business has slackened since the war. I believe that this year the figure will be somewhere between the high and low marks. The average cost before the war ran somewhere between 32 and 34 per cent.

Let's Walk 'round by Tim Jones' Store!

He Changes His Window Every Week and I Want to See It—I Think Mary Would Like Something Electrical for Christmas

"A two fisted grab for trade in the next few days will make a sick business sit up and look as perky as a bantam rooster." This is the way one dealer, a wide awake merchandiser—expressed himself to Electrical News. "The show window is a powerful aid; rightly handled, it is the big stick that clubs business into your store. The bulk of Christmas money is spent in retail stores that make an extra bid for it by dressing up their windows in an attractive way. And that is the reason electrical dealers should be asking themselves—What am I going to put in that window to get the most business?"

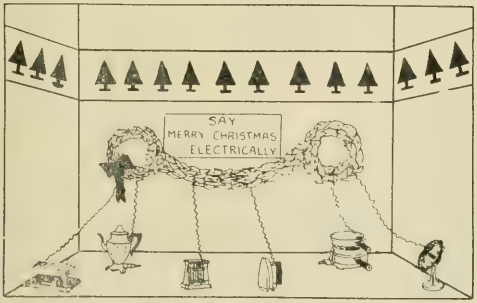
A Special List

A retailer will look over his stock and make a list out of those things that seem most appropriate as Christmas gifts. So far, so good. The next thing is to get these goods into the window in an effective way. This arrangement in the window must be such that it will:

(1) Attract attention.
(2) Create lasting impression.
(3) Pull observer to desire goods.

Taking these things up in the order named, a "Christmassy" appearance is going to attract more attention to the window than anything else. Here is a list of things handy in giving it that air:

- Holly
- Tinsel
- Bells
- Small Christmas trees
- Small Santa Claus figures or cutouts
- Artificial Snow
- Sparkling ornaments
- Small fireplace with stockings



One of the easiest to set up

Scores of different designs can be built with such accessories. It may be mentioned here in connection with point No. 1, that good lighting is necessary to attract attention. Use a moving display if you can. People stop to look at that and linger to study the other things in the window.

A Lasting Impression

The creation of a lasting impression is the real punch of a window display. If Mr. Passerby can look in that window and get an impression that stays with him till he comes that way again, the window is a winner. There is one best way to create this impression—**action** and don't over crowd Too many things in it leave a jumble of impressions, instead of a clear-cut idea.

Action in an electrical display is essential because we sell these goods, not for ornaments, but for what they will **do.**

Creating in an observer the desire for goods is a quality injected in several ways. The general appearance of course helps, the arrangement, lighting and so on, but there are several other little things that work well.

18 Feet Frontage

Take the concrete case of a dealer on a fairly lively business street. Suppose he has about 18 feet frontage, including a doorway in the centre. His windows are small, and he has to make the best of them; naturally he wonders how he is going to make an effective display. Here is one way he can do it:

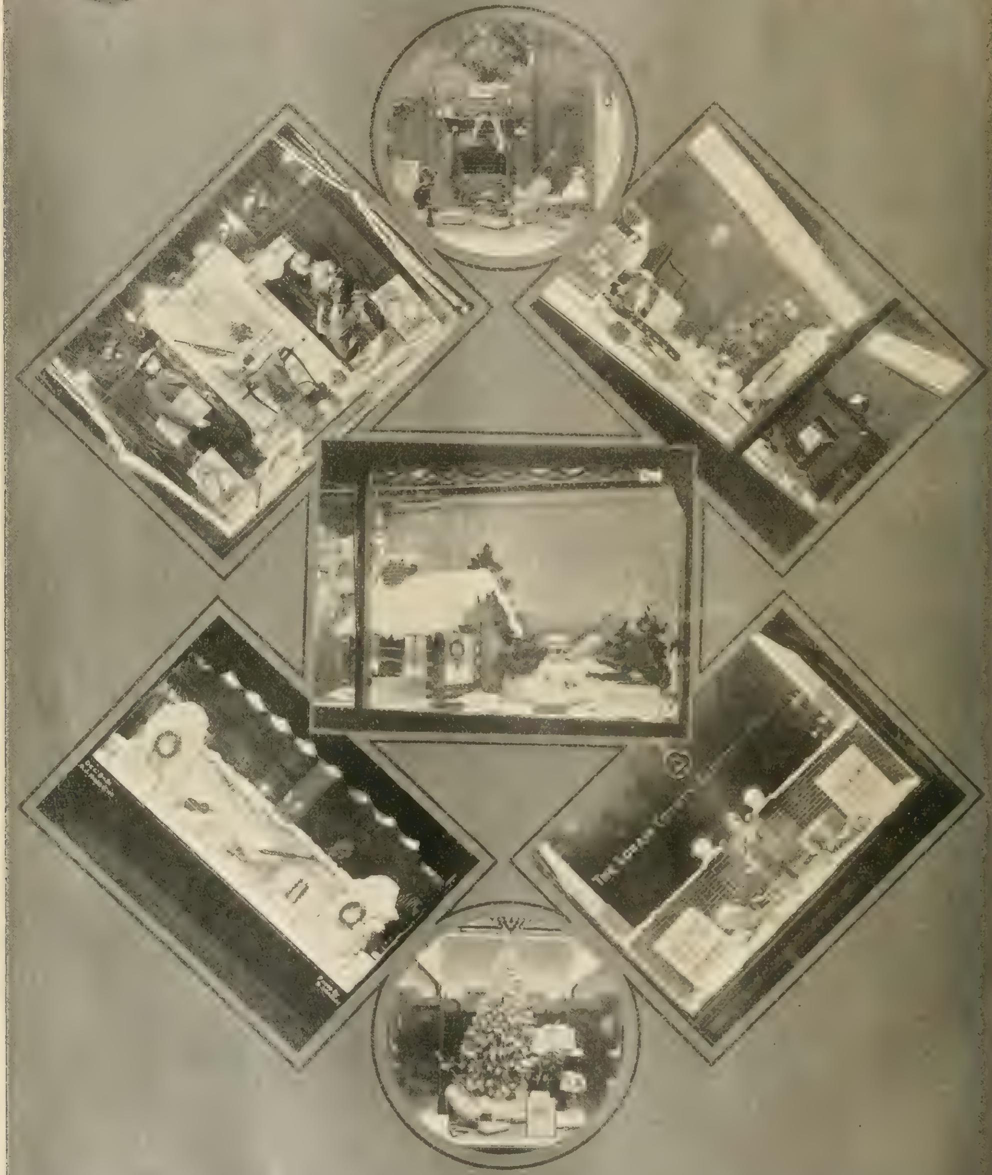
Put a small Christmas tree in the corner next the wall. Trim it up well with tinsel, etc. Have an electric train in front of the tree with a track properly laid out. A card might be attached bearing the words "For That Good Boy." To balance the tree, arrange a vacuum cleaner on the right hand side of the window. This also should bear an appropriate card. Small, daintily wrapped packages should be attached to the tree each bearing cards with Christmas greetings, addressed to some member of a family. Articles such as radio set, electric iron or grill, can be grouped around the bottom of the tree.

In the other window a large bell or Santa Claus head can be set at the back centre and tinsel run to a floor lamp, portable lamp, percolator and so on, grouped nicely in the window and bearing gift cards with holly decorations.

For A Large Window

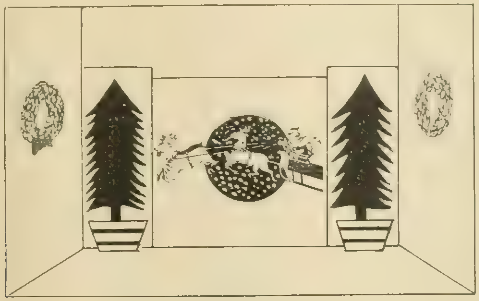
Another plan for a store with one large window, where the owner feels that he is justified in giving a reasonable amount of attention to the display, consists in dressing up the whole window to represent the scene in a well-to-do

Suggestions for Christmas Window Displays



home on Christmas morning. The background has to be well built up and curtains are hung to suggest the walls of a room. A fireplace occupies the left side of the window and a Christmas tree the right hand side. A table is placed in the centre, and groupings of various electrical gifts are arranged about. A wax figure may be used to advantage. The setting is somewhat elaborate but the man whose establishment enables him to carry it out will be well repaid.

One dealer with a very small window solved the problem last year by taking up nearly the whole background with a fireplace, painted on canvas. An electric grate was set in an opening cut in the canvas and a painted board made a nice appearing mantle. Well-filled stockings were hung from the mantel, and a small tree was set on a low table to the left of the fireplace. In this case he was able to use almost all the window space for gift display, with of course, holly and other trimming.



Not hard to make this background

For the dealer who feels he has to put in the simplest possible display, the cedar wreath idea is good. Put a large green wreath in the background, with a good card in the centre bearing the words "Make This An Electrical Christmas."" Run green streamers to various articles in the window. Other decorations should be added where necessary to balance the display, such as holly sprigs and bells or tinsel.

Price Tickets Desirable

The principle of putting prices on goods seems to be well-established. One successful window dresser claims that it the most necessary element for this sort of display. He explains a plan whereby it was possible to combine the gift suggestion idea with a price tag as follows:

"I have found it a good plan to stick several small cards right up on the glass of the window. These are so placed as not to obstruct the window view to any extent and each one bears the words "For Mother," "For Father," "For Sister," and so on. From each one card run a small streamer to the article mentioned. You will find, to avoid confusion, that the grouping will evolve into a more or less circular form. Now put a small but clear price tag on each article, and you have a window that does not fail to attract attention."

Location and Novelties

Location has a great deal to do with the window display. The store that has a constant stream of people passing in front of it is in a good position to handle novelties, that net a nice profit in themselves, and at the same time set off the electrical goods. Small vases, art pottery, candlesticks and such things are great helps in window dressing, but their selection requires great care if their sale is to prove profitable.

"If I had not a Christmas window in now, you can bet your boots it would be in before I went to bed-to-night" said a prominent retailer yesterday. "And I tell you my window looks pretty nice, doesn't it? Well I am going to change it again before Christmas, to keep it looking fresh. You've got to do it if you want business."

The General Effect

The general effect of everybody boosting for Christmas business with special windows is to start the public thinking about electrical gifts—the effect is similar to the community drives for various purposes—It is another case where united effort will bring results.

The windows illustrated on the accompanying page of suggestions were some very fine Hoover displays used a year ago. The decorative ideas underlying these displays are applicable to any other electrical appliances, however, and we reproduce them in the hope that our dealer readers will get some inspiration from them.

When Phoning Your Customers

Here are some pointers on talking to your customers over the phone. They are definite facts that have been discovered by a retailer who went out to get results by this method.

Right time to phone—9 a.m. to 1.30 p.m.
Best hour of day—10 a.m. to 11 a.m.
Number of calls for best results—one a month per customer.
Concentrate your message.
Injection of personality almost indispensable.
Messages should be very carefully prepared, and not left to haphazard judgment.
Avoid any "parrot" tendency.
If possible have women call women.
Evening calls little use.
For best results same man should not call more than 10 to 15 times a day.

Conditions vary in different localities, but the above is a proximate guide. Your phone represents an investment that can be made to pay dividends.

The Lenk Manufacturing Company, Boston, Mass., manufacturers of soldering outfits, lineman solder, blow torches, etc., have announced the appointment of the Smith-Stewart Company, London Law Building, London, Ont., as their Dominion representatives to handle their entire line.

Mr. John Herget, treasurer of the Century Electric Company since 1904 and close associate of all those active in its affairs died on November 14 after a very brief illness.

Weaning the "Shingle" Estimator From His Evil Ways

By REY E. CHATFIELD,
Secretary-manager, Electrical Co-operative League of British Columbia

The improvement of the status of electrical contracting is an end desirable from every point of view. This improvement can be accomplished only by starting with a good foundation and this foundation, to my mind, lies in having a proper costing of all jobs.

The contents of the following bulletin shows an easy way of getting at the fundamentals of costing a job. We all know of the controversies there are about estimating, still it is not uncommon to hear remarks like the following:

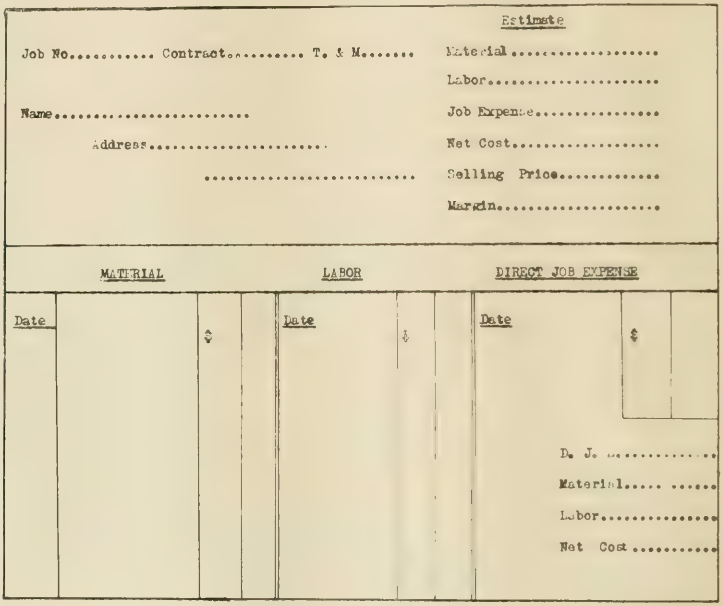
> **"I have been in the electrical business fifteen years and you can't tell me how to price a job or how to figure it, but how the deuce can I tell what I make on a job when I have finished it. Generally I figure upon a piece of paper or a shingle how long I took on the job and about how much material I used and, if the price is larger than the cost I throw away the shingle."**

I have heard the above remark so many times that I believe the best way to answer it is through this bulletin. Every job a contractor takes involves the use of three factors, viz.,—material, labor and expense. Hence the easiest way to ascertain the cost of a job is to segregate these items. I make the suggestion that an envelope be ruled like the form above and used for the purpose of costing jobs.

Each job should be given a number as a means of identification, for example,—

Job No. 1.
Name: John Doe.
Address: 840 Howe Street.

A check mark in the space "Contract" or "T. & M." denotes whether the job is contract or time and material. The details of the estimate are entered in the upper right hand corner. This serves two purposes: it gives the contractor an opportunity to check the accuracy of his estimating when a job is complete and also to check progress as the job is going on.



Job No............ Contract........... T. & M.......

Estimate
Material...................
Labor......................
Job Expense................
Net Cost...................
Selling Price..............
Margin.....................

Name.......................
Address....................
....

MATERIAL				LABOR				DIRECT JOB EXPENSE		
Date		$		Date	$			Date	$	

D. J. ....
Material.......... ......
Labor..............
Net Cost...........

In the three columns "Material," "Labor" and "Direct Job Expense" are entered, the items which make up the cost of a job under those various sub-divisions.

"Material" is material actually used on the job.

"Labor" is time actually used on the job.

"Direct Job Expense" includes car fares, telephone charges, cartage, permit and inspection charges, etc.

Lists of materials and time cards are filed inside the envelope upon the completion of the job.

You will note the word "Margin" as designating the difference between the Selling Price and Net Cost.

To determine the **ACTUAL PROFIT**—Assume the cost of doing business for YOU is,—say 25%—it may be more or it may be less—**You should know**—Take 25% of the selling price and deduct that amount from the Margin and the remainder is your **Actual Profit.**

A 100 Per Cent Interesting Program at Meetings of Calgary Contractor-Dealers

At a meeting of the Calgary Ass'n. of Electrical Contractor-Dealers held on Oct. 26th, a membership committee and program committee were picked from the members present. The membership committee was made up of the following:—R. A. Brotherston Brotherston Electric Co.; J. Cassidy, Crane Electric Co.; W. Hudgings, Howden & Hudgings. It is the duty of this committee to see that all members are at the meetings or report reason for their non-attendance. With this wide awake committee the members are looking for one hundred percent attendance.

The program committee includes the following:—E. M. Duncan, sales manager, Northern Electric Co. Ltd.; Guy Morton, Electrical Engineers, Limited; E. Beard, Budden Beard & Co. Ltd. This committee intend having each member, as well as the non-members, give a twenty minute talk on Electrical Business as it affects Calgary contractor-dealers. A different speaker will be chosen for each meeting.

Guy Budden of Budden, Beard & Company, gave a very fine talk on Retailing and Contracting. He impressed the local dealers and contractors with the idea of knowing their costs, their overhead and the profit they desired. Knowing these facts thoroughly, quote your selling price, forget your competitor and you will be assured of success. Guy is right.

Another Meeting on Nov 9

A regular meeting of the Calgary Association of Electrical Contractor-Dealers was held on Nov. 9. A large number of the members were on hand and when the usual business had been attended to they listened to a fine talk on "Organization" by Mr. E. M. Duncan, sales manager of the Northern Electric Company, Limited. Mr. Duncan carried his listeners back a few hundred years and compared business methods of ancient date with those of the present. Commercial business is only made possible by "Desire"—desire to sell and desire to buy.

Business is only successful so long as we give one hundred cents value for every dollar received. Give and receive dollar for dollar, allowing only that fair margin of profit.

If you estimate an article to be worth five dollars and twenty cents, why cut off the twenty cents even though your competitor might do so; you can't afford to, so why worry about him.

"The constitution of our Association, I believe, means an end to half the troubles encountered in the past as it opens up opportunities of teaching and learning; opportunities to study more closely our fellow man and to know his business troubles and to satisfy ourselves that he sympathizes with us in ours. The natural result will be that the business will be placed on a sounder and more profitable basis, because of that sympathetic understanding one with the other. We have standardizations to respect but price is not one of them. Nothing will more quickly build up a good healthy trade than good honest competition. Regarding prices, the other fellow will be entirely satisfied if he knows that you understand—and act according to your understanding—that no matter what you do to build up a profitable bussiness, most of it will be wasted effort unless you are working from known facts of today's costs of good and today's cost of doing business."

Extensions by Suburban Rapid Transit Co

The Suburban Rapid Transit Co., a subsidiary company of the Winnipeg Electric Railway Co., have made rapid progress on the extension of the pole line in the municipality of Charleswood. General construction work has been completed in wards 1, 3, & 4 and residences in these wards are now being served. The first customer was connected on Oct. 7th.

Tell me not in smiling numbers
Selling costs are what they seem,
And the man who cuts for orders
Gets the lion's share of cream.

If you strive to build a business,
Do not be a human sieve,
Letting leak your needed profit,
Trusting luck will let you live.

Lives of "Dead Ones" all remind us
What it means to sell on guess—
Their departing makes us keener
To sell RIGHT and not sell LESS.

Get your costs as low as may be,
Let your profit be what's fair;
Then will men know where to find you
And will help to keep you there.

For no Trade can long be loyal
To a man who's "all regrets"—
Can't deliver—who's just living
On the interest of his debts.

Live and laugh and work and prosper,
Know your costs and sell at gain;
And continue doing business
When price"busters" split in twain.
Trumbull Cheer.

A Western Electrical Home

Much interest was shown by prospective house builders in the Electrical Home which was recently shown at 1550 Twenty-ninth Avenue, Vancouver, by the Electrical Service League of B.C. The house was loaned for the occasion by the contractors who built it.

All told, many thousands visited the home. In the evening there was especially large crowds attracted by the ideal illumination. The house was flood-lighted at night and could be seen for a considerable distance.

Visitors were met at the door and the various points of interest explained to them. On the closet doors there were automatic switches, while around the baseboards of the rooms there were some 43 outlets for attaching lamps and appliances. The women were shown the beauties of an electrical kitchen and laundry.

The house was shown by a volunteer staff of 13 men to a shift. In all 116 electrical men of the city served on the house committee, and every man in the industry co-operated. Among the captains of the various shifts were the following: J. R. Real, local manager, Westinghouse Company; J. F. Little, local manager, Northern Electric Company; H. Pim, local manager, Canadian General Electric Company; W. C. Mainwaring sales manager, Northern Electric Company, S. Smith, assistant manager, Canadian General Electric Company; E. E. Walker, sales engineer, B.C. Electric Company; E. Brettell, W. N. Fraser, C. C. Carter, P. F. Letts, P. Farr, S. E. Jarvis, D. Ormsby, George Horsman, Harry Stephenson and H. V. Rankin. J. Lightbody was chairman of the house committee, and R. E. Chatfield, secretary-manager of the Electric Service League, manager of the home.

In a bulletin issued by the B.C.E.R.Co., it is stated that there are about 130,000 persons carried per day in Vancouver city, with 50 per cent more on holidays, or other big days.

The Question of Manufacturer Guaranteeing His Products Discussed at Fortnightly Luncheon of Manitoba Electrical Association

At the fortnightly luncheon of the Manitoba Electrical Association held at the Fort Garry Hotel, Winnipeg, on Thursday the 16th November, the subject of "Guarantees" was discussed.

The discussion was led by L. M. Cochrane, who wanted to know whether guarantees are justified from the standpoint of the electrical manufacturer, jobber and retailer. Today nearly every electrical appliance is guaranteed, and has a guarantee tag attached to it, therefore the public expect it. It is not so in other lines, such as automobiles, jewelery, and furniture; the only guarantee you have is the good standing of that dealer; the product has no written guarantee. You buy a phonograph at any price from, say, $50.00 to $500.00. Do you get a guarantee Certainly not. Then why should the public expect to get a guarantee on a four or five dollar appliance. What is the idea of a guarantee The public seem to think it is something given away free. There is no doubt that it keeps prices up, as the manufacturers have to set aside a certain amount for replacement. We have taught the public to ask for guarantees. The goods that should be guaranteed are only those bought in second hand stores. Dealers should be able to give service on repairs instead of replacing.

J. E. Lowry, president of the association, said that too much was expected of the manufacturer, he was practically called upon to guarantee against wear and tear. George Wright, manager of the C.G.E., wanted to know how the dealer could determine whether a lamp had been used at right voltage, or an electric iron allowed to burn all night. Mr Wright stated that guarantees were started to introduce new lines, such as electric irons, to get the public to break away from the old fashioned flat iron. In his opinion the guarantee is a supporter of inferior appliances. If guarantees were removed it would establish a better standard with the manufacturer. The public are liable to burn a lamp 1000 hours, and then expect the dealer to replace it. Mr. Wright thought that guarantees could very easily be taken off electric irons, but perhaps not so with ranges, water heaters, and other appliances.

L. B. Dickson took a somewhat different view on the subject, he said that as long as manufacturers are ready to guarantee goods they will be supported by most dealers. Mr. Dickson does not believe in contradicting a customer over a small article such as a lamp. That customer may be a prospect for four or five hundred dollars worth of fixtures.

Mr. Dodds, of the Canada Dry Cells thought that the public in our community should be protected, as we make our bread and butter from them. One manufacturer some time ago turned out a range that was not perfect, but guaranteed it, and replaced about 60 or 70 in Winnipeg, thereby gaining the good will and confidence of the public.

Mr. Minty, of the Manitoba Telephone System said that it was not necessary to guarantee goods, as a reputable manufacturer will always stand behind his products.

Mr. Allen, of the Great West Electric Co. Ltd., said that manufacturers of inferior goods take advantage of guarantee tags. The automobile industry use the word "Warranted" instead of guarantee; the latter word seemed to be the cause of no end of trouble.

Morris E. Deering, felt that it was not necessary for any reputable manufacturer to guarantee his lines, as he will always stand behind his products. Very often jobber's representative will try and sell the dealer on service instead of merit. This is another disadvantage of the guarantee.

Prominent Electrical Contractor-Dealers

—2—

R. A. L. Gray, Eastern Canada Representative National Association of Electrical Contractors and Dealers

Mr. R. A. L. Gray, electrical engineer and contractor, Toronto, whose retail store at 85 York St., is one of the landmarks of the city, has been in business on his own for nearly twenty-four years. Mr. Gray started out in life with the idea of confining himself entirely to engineering work, entering the school of practical science in the early nineties. The lure of active business life was too much for him, however, and after two years at the university, we find him gathering practical experience with the Canadian General Electric Company, to be followed almost immediately by the formation of his own private business.

R. A. L. Gray

He is one of the best-known and most highly respected business men in Toronto and has an enviable reputation for knowing his costs, figuring his estimates on the basis of a fair profit and for standing out against price cutting. His motto may be summed up briefly as follows—Do business at a profit or not at all.

Mr. Gray is conscientiously and aggressively active in all association work. He claims that he finds it repays him in dividends, but his friends believe he would do it for the benefit of the industry in any case. For example, he is an active member of the Toronto Association of Contractor-Dealers, the Ontario Association of Contractor-Dealers, and is Eastern Canada representative on the National Association of Electrical Contractors & Dealers, with which the Canadian associations are affiliated.

Taken by and large, it would scarcely be possible to find an electrical man of whom the electrical industry in Canada has greater reason to be proud.

Instructions For The Dealer to Pass on to the Radio Beginner

The antenna need consist of only one wire having a stretch of from 75 to 150 feet, the longer stretch being preferable. Procure some antenna wire consisting of a stranded cable of phosphor-bronze, select two convenient points, a suitable distance apart and as high as possible, between which the antenna is to be stretched. This stretch should be clear from all surrounding objects and at least 20 to 25 feet high. Antenna insulators may be made from scrap fibre by cutting a piece six inches long by one inch wide and 3/15 to ¼ of an inch in thickness. Bore a small hole in each end of insulator, and place one on each end of antenna wire, fastening a supporting wire onto the free end of each insulator and tying same onto the most convenient place. Where one lives in town it is often difficult to secure a proper location for an antenna often necessitating the erection of a pole on the house top and back yard. The most efficient antenna will be one that is long enough, high and free from surrounding objects.

Having decided on a location for your radio set, it will be necessary to secure a wire connection to the antenna and ground. To bring the antenna and ground wires into the building it is necessary to bore holes through sill into which porcelain insulators may be inserted through which the wires are run. In order not to interfere with the sash cords these holes should be placed either at the top or bottom of the sill. A lightning arrestor, ground pipe clamp, No. 14 rubber covered wire and porcelain knobs are needed to complete the installation.

Connect a lead-in wire, of the same size as used on antenna, on the antenna end nearest the instruments, and run same down to the lightning arrestor, which may be fastened outside the house right near the point of lead-in. The nearest water-pipe will provide a suitable ground connection. Its surface should be scraped clean at the point of fastening of the ground clamp. Then the No. 14 rubber covered wire may be connected to the ground clamp and run on porcelain insulators up the side of the house to the other end of the lightning arrestor. Two insulated wires, one on each side of the lightning arrestor, corresponding to antenna and ground connections should be led into the house through the porcelain tubes provided. These two wires are to be connected on the antenna and ground posts of the receiving set.

We are now ready to operate the set which we will assume of the construction decribed in a previous issue. Having connected the headphones on to the binding posts marked "head-set", place same over the head, adjusting headband until the receiver caps fit tightly over the ears. A slight adjustment of the hair spring resting against the crystal of the crystal detector will be necessary until a sensitive spot is found. One cannot tell, however, whether a sensitive spot is reached unless a signal is heard.

After having tuned in a radio signal by varying the switch lever over the 10 taps, selecting the one that gives the best signals, the detector may be adjusted for maximum sensitivity by trying various points on the crystal until maximum signal strength is obtained. It will be noticed that the different classes of stations will all be heard on their respective taps on the switch lever due to the fact that each tap responds to signals of a given wave length.

It is not only possible to hear short distance radiophones with this set, but also amateurs and ship stations at a greater distance transmitting code messages. Of course, these messages are meaningless unless one masters the code.

Holland Builds Big Radio Plant

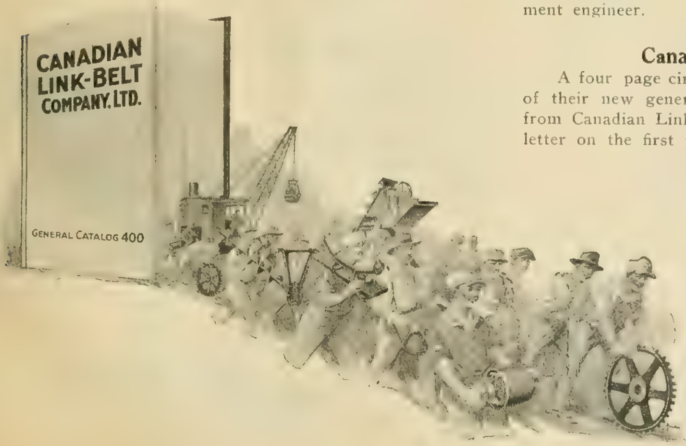
The Dutch Government is establishing a very powerful wireless sending and receiving station at Kootwyk, in the province of Gelderland, covering an area of 750 acres. Another station for receiving will be established 30 miles southward. Five masts, 700 feet high, have been erected at Kootwyk, weighing 100 tons each. The work is being directed and the materials supplied by the German Telefunken Company, and the station is expected to be ready for service at the end of the year. Kootwyk station will be equipped with a special duplex system to receive and send simultaneously to and from Java, 7,500 miles distant.

Announcement

The Signal Electric Manufacturing Company of Menominee, Michigan, has acquired the Hulbert patents and taken over the assets and liabilities of the Hulbert Electric Manufacturing Conmany of Chicago, Illinois. Under this arrangement production of the Hulbert battery charger will be increased and others of the Hulbert patents will be developed and put into production. Mr. C. H. Hulbert will hereafter be identified with the Signal Electric Manufacturing Company, in the capacity of research and development engineer.

Canadian Link-Belt Catalog

A four page circular letter, announcing the publication of their new general catalog, No. 400, has been received from Canadian Link-Belt Company. This circular carries a letter on the first page suggesting that engineers, superintendents and purchasing agents send for a copy, and provision is made on the last page for eight separate requests. The two inside pages are devoted to an illustration of the catalog, as shown herewith in miniature, and as this illustration is in colors, the effect is novel and striking. The idea of men walking out of a catalog carrying the actual articles illustrated in the book is something quite out of the ordinary. If you did not receive one of these circulars, address the Company, either in Toronto or Montreal.



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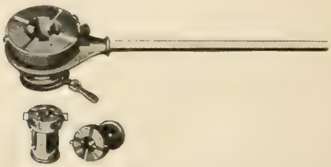
[*] From information supplied by S. W. Place, Radio Engineer, Diamond State Fibre Co.

The Latest Developments in Electrical Equipment

"Beaver" Ratchet

The Borden Company, Warren, Ohio, has placed on the market a ratchet for threading pipe ranging in size from ½ in. to 2 in. diameter. It is claimed that the No. 4 Beaver Ratchet is one of the easiest threading 2 in. die stocks manufactured—a spring balance scale registers only 28 pounds pull on 2 inch pipe.



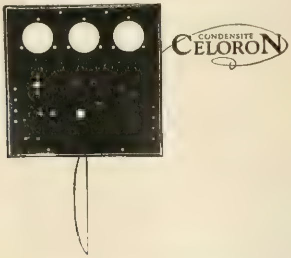
It is receding die stock, using narrow dies that ease the labor as the thread is cut. Separate dies and bushings are furnished for each size pipe.

Cable Bender

A tool for bending and forming cable in manholes, vaults or other cable installations has been placed on the market by T. J. Cope, 2112 Sansom St., Philadelphia, Pa. The device is made of forged steel with a steel tube extension handle. All sizes of cables from 500,000 c.m. to 2,000,000 c.m. are taken in by means of six adjustments. Dimensions are 26 in. closed, 34 in. with handle extended. Weight 12 lbs.

Shielded Panel Material

A condition with which all radio operators are familiar is the capacity effects of the operator's body in tuning. This phenomenon is a most annoying and troublesome impediment to expert operation.



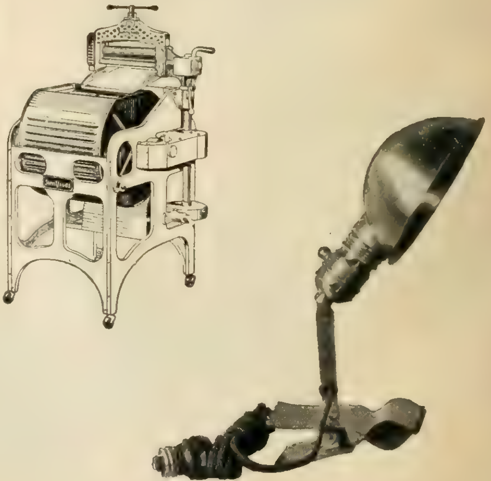
Supplied by Diamond State Fibre

To overcome this, there has been developed a shielded panel material. This important development consists of a special metal plate embedded just under the back surface of the panel. The outstanding feature of this construction is that it lowers body capacity and minimizes detuning effects.

A New Safety Range Switch

A new type of switch, specially designed for use with electric ranges, and known as the W-K Safety Range Switch, has recently been developed by the Westinghouse company. The special features of this switch are simplicity of construction, safety to the operator, and attractive appearance. It consists of a rugged knife switch, suitable for either two or three-wire 125/250 volt circuits, mounted in a steel cabinet and operated by an external handle. The cabinet is finished in baked white enamel, which is easily cleaned with a damp cloth. The cover of the cabinet is held in place by screws, so that no one can accidently come in contact with live parts. The handle may be locked in the "off" position if the operator so desires. Knock-outs, accommodating the different sizes of conduit, are provided in all sides and the back.

Ideal Christmas Presents



Left—Sunnysuds Washing Machine, Onward Mfg. Co. Below—Adjustable Lamp, W. H. Banfield & Sons

Current News and Notes

Brandon, Man.

Mr. J. B. Harvey, local manager, states that re-arrangement of their entire plant is being planned by the Canada Gas & Electric Corporation. The work will include the installation of new boilers and other machinery. It is reported that the company may improve their dam on the Little Saskatchewan River.

Calgary, Alberta

The local Association of Electrical Contractor-Dealers instructed the secretary to send a letter of condolence to R. S. Trowsdale, sales engineer of the local branch of the Canadian General Electric Company, Ltd., whose wife passed away on Monday October 30th,

The Brotherston Electric Company have been successful in securing the contract for wiring the Indian School at Gleichen, Alberta. This is one of the largest contracts of the year.

Howden & Hudgings have just completed the installation of nine electric ranges and water heaters in the Radio Apartment Block, Calgary. Tom Howden sure believes in "Do It Electrically."

Lloyd Orr has just completed a contract installing five electric ranges in a local apartment house.

A. P. Horner, manager of the Calgary branch of the Canadian General Electric Company, Ltd., has been disappointed at not receiving any orders from the South Territory for the past five weeks, but if he will only stop to consider that the salesman covering that territory, W. E. Thurman, married Miss O'Harris on October 20th, he will need no other reason. Give Ted a chance and he will come back to true form alright.

Cannington, Ont.

J. E. Cornfoot, Hydro superintendent for the past six years of Sunderland, Cannington & Woodville, Ont., has recently been presented with a new office, handling electrical appliances. He is a well known electrical man and is now very busy electrifying farms in and around his district.

Chesley, Ont.

It is stated that the hydro debt against the town of Chesley for difference in cost of power, as ascertained by annual adjustments, is $6,654.73. This is the accumulation of several years. The charge for depreciation fund is to be lowered from 5 to 1¾ per cent, and as this is to be retroactive for two years, and as a surplus is expected this year, the debt will be wiped out, it is expected, by the end of 1922. Hydro was installed in Chesley in June, 1916. The original cost of installation was $27,500 and with extensions which include two farmers' buildings near town, the present plant stands about $30,000.

Edmonton, Alta.

Bert L. Perry, Ltd., 10033-202nd Street, Edmonton, Alta., has recently been awarded the electrical contract in connection with the following buildings: Marshall's warehouse to cost $40,000; Strathcona hospital wing, $175,000; Eastwood school, $175,000 and Hudson Bay stores, $15,000.

Ford City, Ont.

An additional sum has been voted by the town council in a contract with the Northern Electric Company to supply an underground system in connection with the placing of the fire and police signal apparatus.

Fredericton, N. B.

Mr. C. O. Foss and J. D. P. Lewin, chief engineer and legal adviser, respectively, of the Hydro-electric Commission, recently appeared before the cabinet of the Provincial Government. They presented a proposed bill suggesting legislation that would create electrical districts so rural communities could more readily organize and take advantage of hydro power development.

Hamilton, Ont.

A full report on wires and poles was presented to a committee of the city council recently by E. R. Gray, city engineer. The report showed that the Dominion Power and Transmission Company had wires on 162 poles belonging to other companies and 226 poles of its own. The Bell Telephone Company had 101 poles in the restricted districa and the C. P. R. 51. The city fire department used 112 poles, of which 19 were its own. The G. N. W. used 154 and the Hydro 45. The estimated cost of putting the fire department wires under and installing new signal boxes was $16,000. If the old boxes were used the cost would be $9,000.

Mr. E. J. Sifton states that more heaters have been sold recently than during all the rest of the time the Hydro has been in business.

Hanna, Alta.

The town of Hanna, Alta., are erecting a new electric light and power plant, estimated cost for site, wells, coal siding, building and machinery $35,000. Re-building and extending pole line services, estimated cost $4,500. The Canadian General Electric Company, Calgary branch, were awarded the contract for the plant and pole line material; boilers by Canadian Allis Chalmers Co., and engine by Goldie McCulloch Co., of Galt, Ont.

Manitoulin Island, Ont.

An estimate of the cost of developing power at Kagawong Falls is to be prepared. This will be done by the firm of James, Proctor and Redfern, of Toronto.

Meaford, Ont.

The town of Meaford was recently in darkness because the Georgian Bay Milling and Power Company, which supplies electric power for the town, suspended business, and all electric power was cut off. The closing of the electric power plant meant the shutting down of the Steel Products plant, the Meaford creamery, the town newspapers, local printing offices and various other concerns. The trouble was remedied inside of 24 hours.

Niagara Falls, Ont.

Owing to the rapid increase in the power loads on the Niagara system, the Hydro-Electric Power Commission of Ontario has notified the municipalities and customers supplied from that system, that their power demands must not exceed their present demands until the installation of the fourth generator unit has been completed in the Queenston plant. The amount of power generated and purchased by the Commission at Niagara is now in excess of 525,000 h.p., approximately 183,000 h.p. of which is being supplied by the three generator units installed in the Queenston generating station. There has been an increase in the amount of power supplied on the Niagara system of over 100,000 h.p. since December, 1921.

Ottawa, Ont.

In a judgment given recently Judge Mulligan reversed the decision of the Court of Revision and decided that the Ottawa Electric Railway is not liable to be assessed for city business tax. The Court of Revision had upheld the city's right to collect business tax from the company and an appeal was taken by the O.E.R. to the county judge. Judge Mulligan sustained the appeal on the ground that the agreement entered into in 1893 between the city and company contemplated exemption from taxation now known as business tax.

The 1893 agreement states that the Ottawa Electric Railway was exempted from taxation and all other municipal rates on their franchises, tracks, rolling stock and other personal property. In 1904 the province created the business assessment under which any person or firm carrying on a tramway business or street railway business was subject to a business assessment equal to 25 per cent. of the assessed value of the land. The question at issue was whether this business tax imposed in 1904, affected the Ottawa Electric Railway.

Quebec, Que.

The exportation of power from Quebec to United States by the Montreal Public Service Corporation is foreshadowed in a bill which was given its first reading before the Legislative Assembly on November 17. The bill amends the charter of the Montreal Public Service Corporation, changing its name to that of "The Quebec New England Hydro-electric Corporation," and seeks to permit of the company doing business outside of the Province of Quebec. The petitioner is E. A. Robert, president of the company.

Queensville, Ont.

At the present time the village is without electric lighting, and an effort is being made to obtain power from Newmarket for this purpose.

St. John, N. B.

The recent election of G. Fred Fisher to the mayoralty of St. John was decided on a public ownership issue. His campaign platform calls for the completion and signing of a contract with the New Brunswick Electric Power Commission for hydro current and the appointment of an independent civic Hydro-electric Commission to construct a civic distribution plant; second, completion of plans and specifications for a civic distribution system; third, an offer of $2,577,655.56 to be made to the New Brunswick Power Company for its entire property, this sum to be the maximum and the offer to remain open ten days; fourth, in the event of the offer not being accepted by the power company the city to proceed immediately with the construction of its own distribution system.

Sudbury, Ont.

A. P. Kutchaw of Sudbury, Ont., a well known electrical contractor also plumbing and heating contractor, doing business in Sudbury for many years, has recently opened a fine store on Elm Street, Sudbury, dealing in electrical appliances, plumbing and heating.

Toronto, Ont.

Tomlinson and Forbes, 29 Duke Street, Toronto, are discontinuing the sale of radio parts to dealers and will place their equipment in future through jobbers only. They have now opened an electrical department specializing in re-winding motors and generators.

West Vancouver, B. C.

A by-law embodying important provisions in regard to the supply of light, power and railway service to West Vancouver was recently passed by a large majority. Under this agreement the company will have the right to continue to collect the six cent fare, but in return will undertake certain paving work, will grant a reduction from six to five cents in the lighting rate, will establish motor bus lines in the outlying portions of the city, and will make other concessions to the city. The concessions granted by the company, it was estimated by City Engineer Fellowes, would entail an expenditure by the company of approximately $800,000, in one item alone, that of replacing overhead wires with underground cables, the company agreeing to spend the sum of $250,000 during the next five years. The agreement will remain in force for five years, and before that period expires provision is made for appointment of a board of arbitration, should the city and company be unable to reach an agreement in regard to a further extension. The work of installing the electric light lines, according to the agreement, will commence before the end of November and the company undertakes to complete the system within the water area in four months. Sixty-four street lights will be installed at a cost for the area affected of $45 per year each.

Windsor, Ont.

Mr. G. S. Whelpton, 856 Hall Avenue, Windsor, has recently got several sizeable electrical contracts. These include the Leamington high school, and a truck factory in Walkerville.

A report was recently forwarded by Sir Adam Beck to Windsor city council, showing the financial condition of the street railway. It deals with every feature of the railway management for the 30 months it has been under Hydro control. The report enumerates various circumstances that have cut down revenue and shows that notwithstanding receipts has been more than sufficient to meet total operating expenses, interest charges and taxes. Summarized, the statement presents the following items:

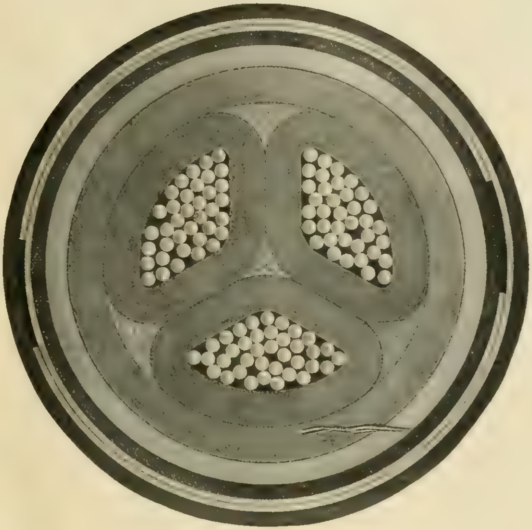
Maintenance of way and structures $97,993.30; equipment, $158,561.89; power, $124,656.84; transportation, $493,474,75; general and miscellaneous, $162,154.18; taxes $11,466.81; total expenses, $1,048,307.27; revenue, $1,316,445.58; net revenue, $268,138.31; interest, $262,930.99; surplus, $5,207.32. The report was forwarded in conformity with a request from the city council, which stated that they wished to see a financial statement before the fare boost of 5 to 6 cents was put into effect.

Winnipeg, Man.

The by-law providing for a ten-year extension of the franchise of the Winnipeg Street Railway was recently passed at its first reading. The by-law provides for remodelling the rolling stock; for certain extensions; for option to the city to purchase company's franchise rights in 1937, paying only for physical property and not franchise value, including any franchises and property in adjacent municipalities; for a joint pole agreement and for a progressive scheme for placing wires underground; for a sliding scale of reduced fares which will reach the five cent basis in 1926; for the taking over of the company's system, in default (after notice to remedy) of certain of the provisions of the agreement and many other matters. The by-law will have to pass other readings, a referendum being expected in December.

Messrs Gamble and Wills have removed from 306 Notre Dame Avenue, to more centrally located premises at 342 Garry Street, Winnipeg. During the week that they have been in their new store they report splendid business, far better than they ever anticipated. Considering they are a young firm they have made splendid progress, and great credit is due them.

POWER CABLE



350,000 C. M. 3-Conductor 12000 volt
Paper Insulated, Steel Tape Armoured Cable

Overall Diameter—3.62 ins.
Built to Specification of Hydro-Electric Power Commission of Ontario

---

Eugene F. Phillips Electrical Works, Limited
Montreal

The Oldest and Largest Manufacturers of Bare and Insulated Wires and Cables in the British Overseas Dominions

Wiring Contracts Awarded

Hamilton, Ont.

J. A. Dynes, Prospect St., $65,000 office bldg., Main & Walnut Sts.

R. Avis, 157 Balsam Ave. on add. to office bldg. "Delta."

Kitchener, Ont.

Star Electric Co., 91 King Street, West, $250,000 city hall, King St. E.

Lakeside, Ont.

A. Willard, $3,500 res.

Lunenburg, N. S.

Lunenburg Gas Co., $8,000 res., Lincoln E. end.

Moncton, N. B.

F. Cuthbertson High St., $4,000 res., Maple St.

Duffy & McCarthy, Lutz Street, $4,000 res., Bromley Ave.

Montreal, Que.

Booth Bros., 5727 Sherbrooke W., $35,000 four res., Percival Ave.

A. Forget, 157 Monk Blvd., $10,000 two flats & two stores, Joicoeur.

A. Garey, $8,000 three flats, 1463 Delorimier Ave.

B. Gregory, 55 Metcalfe St., $19,200 res., Rosemount.

R. S. Muir & Co., 32 Park Ave., $45,000 four res., Belmore Ave.

Vallee & Hamelin, 1867 St. James St., $11,000 three flats, Richelieu & Agnes Sts.; $20,000 res., Blvd. St. Joseph.

Mr. Quesnel, $5,000 res., Hibernia.

New Toronto, Ont.

J. McNeice, Stop 27 Lake Shore Rd., on school.

Niagara Falls, Ont.

Perry Bros., $7,000 res., River Rd.

J. W. Thomas, 45 Fifth Ave., on residences, totaling $107,500.

Ottawa, Ont.

H. L. Allen, 272 Bank Street, $15,000 double dup. res., Clarence St.

Mr. Blakeney, $4,000 res., Noel St.

Mr. Booth, $4,000 res., Bertrand St.

J. N. Cherry, 50 Victoria St., altg. res. to flats $5,000 Sommerset St.; $7,000 res., Linden Terrace.

W. S. Chugg, $5,500 double res., 5th Ave.

Stan Lewis, 63 Metcalfe St., $20,000 club house, Cameron Street.

Oakville, Ont.

F. Sullivan, $6,000 res., Spruce St.

Rockcliffe, Ont.

H. L. Allen, 272 Bank St., $18,000 res., Nr. Ottawa.

St. Catharines, Ont.

Mr. Desand. 187 St. Paul St., on two stores, Ontario & Merritt Sts.

St. John, N. B.

Driscoll & Mackie, King Sq., $10,000 two tenements, Paddock St.

Sault Ste. Marie, Ont.

Rapid Electric Co., 725 Queen St. E. $7,0000 store block, Wellington St. W.; $14,000 garage, Queen St

Greenwood Electric Co., 812 Queen St. E. $3,000 res., Bloir St.

Upper Electric Co., Ferry St. Niagara Falls, $8,000 ado. high school, Victoria St.

Toronto, Ont.

Geo. Armstrong, 1217 College St. $7,000 each, 60 bungalows, Briar Hill Ave., Birdsall Ave. & St. Clements Ave.

Douglas Bros., 2137 Yonge St., $5,000 each two res., Cuthbert Cres.

N. McLeod, 808 Danforth Ave., $7,000 1 pair res., Strathmore Blvd.

Mr. Richardson, Oakmount Ave., $15,000 store & apt., 778 St. Clair Ave W.

B. C. Taylor, 123 Ellsworth Ave., $25,000 five res., Rockwell & Chambers; $9,000 res., Roehampton Ave.

Toronto Electric Co., 101 Duke St., $10,000 add. to bldg., Nepawa Ave & Roncesvalles.

E. Warman, 209 Soudan Ave., on res Carey Rd.; $4,500 each two res., Erskine Ave.

Verdun, Que.

S. Quesnel, 309 Church Ave., $18,000 res., Evelyn & Strathmore.

Waterloo, Ont.

Otto Reiber, King St., $15,000 res., Albert St.

Company Incorporations

Canadian Wireless Telephone Company, Limited. $100,000, Toronto; manufacture, etc., of wireless equipment.

The Beacon Electric Manufacturing Co., Limited, Hamilton, Ont., buying, manufacturing, etc., of electrical goods of all kinds

Wireless Corporation of Canada, Limited, $50,000, Montreal, manufacturers, etc., of wireless and other equipment.

Keith Electric Refrigerator Company, Limited, $100,000, Toronto, manufacture, etc., of electric and other refrigerators.

Domestic Power Company, Limited, $49,000; generation, sale, etc., of gas and electricity; counties of Nicolet, Lotbiniere Arthbaska and Megantic, Quebec.

Les Usines Frappier, Limited, $100,000, Montreal; Manufacture, sale, etc., of electric motors and water heaters.

Canadian 'Lectromelt Furnaces, Limited $50,000, Toronto; Manufacture, sale, etc., electric furnaces, appliances and so on.

Purdy Radio Phonograph Company, Limited, $40,000, Toronto; manufacture, sale, repair, alteration, etc., of radio and phonograph goods.

The Bracebridge and Northwood Telephone Company, Limited, $4,000, Bracebridge, Ont., construction and equipment of Telephone Systems.

The Maple Grove Telephone Company, Limited, $1,200, Shelburne ,Ont., construction and equipment of telephone systems.

Christmas Merchandising Campaign of the Electrical Service League of British Columbia

A determined effort will be made by members of the Electrical Service League of British Columbia to obtain a fair portion of the Christmas trade this year through co-operative effort.

Beginning the first of December billboards scattered over the city of Vancouver will carry the message—

These posters are most attractive. In five colors is depicted an attractive Christmas scene—an electrically equipped dining table placed at a window looking out into the snow.

This billboard poster is one of a series of six, each to run for a month, all carrying the message "Electrify."

The B. C. Electric Railway Company is financing this campaign, which, however, is put out under the auspices of the electrical dealers of the city.

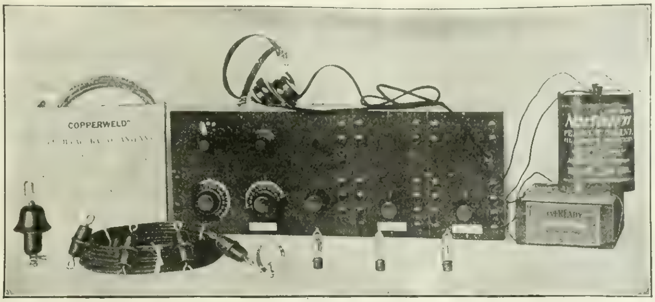
In addition, small 'bullet' advertisements carrying the slogan "Electrify—Give Electrical Gifts" will appear daily in the newspapers. Small cuts of this same slogan will be furnished all firms using separate space for advertising, either in the newspapers or in the street cars.

Small gum stickers in Christmas colors carrying the same slogan will be used by all electrical firms for pasting on parcels, on bills, letters, etc.

During the week of December 17-24 six large co-operative advertisements promoting the sale of appliances for Christmas gifts will appear in the newspapers of Vancouver and New Westminster.

The expense of this part of the campaign will be financed by the power company, the manufacturers, jobbers and contractor-dealers. In addition to specific suggestions for Christmas gifts these advertisements will carry the names and addresses of the co-operating firms.

All dealers will use, in addition window streamers in appropriate colors, bearing the same Christmas slogan "Electrify—Give Electrical Gifts."



The Northern Electric R 1000 Radio Telephone Receiving Set
The Set with the famous Peanut Tube, eliminating the charging of Batteries

"If Winter Comes"

AND YOU HAVE RADIO—

You are assured of high-class entertainment in your home throughout the long Winter evenings.

Radio has come to stay, not for this winter, but for all future winters.

It is acclaimed already as the "Great Home Builder"—it keeps the family circle intact.

The wonderful broadcasting of distant Canadian and United States Broadcasting Stations now being received by owners of the Northern Electric R-1000 Receiving Set is giving genuine satisfaction to thousands who "listen in" nightly to some of the finest artists of our time.

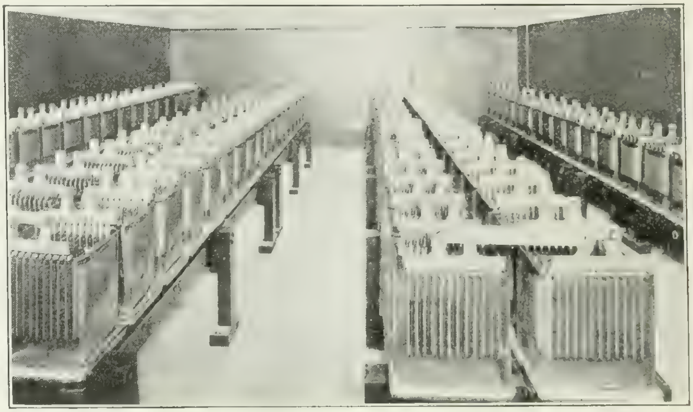
Write for our bulletins describing Radio Sets and parts

Northern Electric Company
LIMITED

Montreal Quebec Toronto Windsor Regina Edmonton
Halifax Ottawa Hamilton London Winnipeg Calgary Vancouver

Ask your dealer or write our nearest house

The system of storage batteries for oil switch control, illustrated below, is the largest and most complete used in Canada exclusively for that purpose. It consists of two batteries and motor generators, so that one unit can float on the load at approximately constant voltage while the other battery is being charged.



EACH of the two Exide oil switch control batteries at the Queenston generating Station of the Hydro Electric Power Commission of Ontario consists of 110 cells having a capacity of 154 amperes for one hour at 230 volts, and each is capable of supplying 700 amperes for one minute for the operation of the switches and control equipment.

The switchboard indicating and signal lights are operated from duplicate 16 cell E-5 Exide Batteries floating on a 32 volt operating bus.

EXIDE BATTERIES OF CANADA, LIMITED
153 DUFFERIN ST., TORONTO, ONT.

Exide
MADE IN CANADA
BATTERIES

WHAT IS DIAMOND FIBRE?

We have selected the Electrical News as a medium to tell the Electrical Industry of Canada something about this remarkable material.

Each month we will discuss in some detail a standard part made from Diamond Fibre.

OUR CATALOGUE

Explains the process of manufacture from the cotton rags to the basis forms of sheet, rod or tube. It also illustrates many of the parts used by almost every industry.

The technical data should be of special value for your files.

A copy will be mailed upon request.

Diamond State Fibre Company

of Canada, Limited

Toronto, Ontario

F Diamond-F

F Diamond-F

THE L. and N. COMPANY Limited

ST. JOHNS, Que.

TORONTO
Robert G. Ross
56 Carlton St.

WINNIPEG
Fred. E. Garrett & Co.
501 Confederation Bldg.

MANUFACTURERS OF FLEXIBLE CONDUIT AND KRAFT PAPER CORD

LOOMDUCT

A Single Wall Conduit of Unusual Flexibility.

Every coil of "Loomduct" and "Insuladuct" is fished at the factory and guaranteed against defects of every kind.

INSULADUCT

A Double Wall Conduit of Great Strength and Durability.

TRADE MARK Loomduct REGISTERED

APPROVED BY THE BOARD OF FIRE UNDERWRITERS : :

TRADE MARK Insuladuct REGISTERED

THE FOLLOWING SIZES ALWAYS IN STOCK:— ¼" ⅜" ½" ⅝" ¾" 1"

"NORTHERN"

The Better Heating Pad

(With Liberal Discounts for you!)

Three heats

Cutler-Hammer Switch

Size 12″x15″

Extra heavy eider-down cover

Washable Slip

Resolve to sell the best and make some real money on heating pads. You can do it with the "NORTHERN." The "NORTHERN" Heating Pad is constructed of the best of material and the quality cannot be surpassed. It is one of the best pads being manufactured today, regardless of price.

The "NORTHERN" Heating Pad is furnished complete with ten feet of cord, a three-heat switch, a two-piece attachment plug and is covered with soft eiderdown. A white washable slip is also furnished.

Specify "Northern" for the Holiday trade
—ORDER NOW—

Northern Electric Company
LIMITED

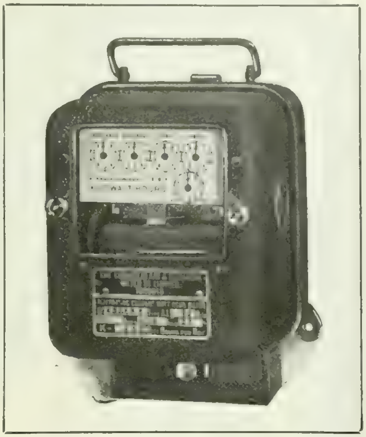
Montreal Toronto Hamilton Windsor Regina Edmonton
Halifax Quebec London Ottawa Winnipeg Calgary Vancouver

Government Re-Testing

302 C & H Meters were due for re-inspection in an Ontario town.

They were sent into the test room on Monday, the following Friday 302 Meters left the test room resealed, no parts or repairs being required to accomplish this end.

How's this for quality and reliability? Send us your orders.



Chamberlain & Hookham Meter Co., Limited

243 COLLEGE STREET, TORONTO

Branches all over the World

Thomson Electric Motors

in use in many of the largest manufacturing plants in Canada

are built by

FRED THOMSON CO., LIMITED

ELECTRICAL ENGINEERS

7-13 ST. GENEVIEVE STREET MONTREAL

Reduce the Cost of Installation

USE

"TRICABLE"

**The most Modern, Economical
Method of Protected
Wiring**

Bends on a 2″ Radius

All Sizes
Carried in Stock

Selling Agents

Conduits Company Limited

Winnipeg - Toronto - Vancouver

Standard *RADIO* Equipment

(De Forest Patents)

A reputation for manufacturing radio receiving sets that give greater efficiency than any other make is creating a demand for our sets that even with our increasing production will tax all our resources to keep up with it.

To own a radio set manufactured by us is to ensure the maximum enjoyment to be obtained from radio.

PLACE YOUR ORDER NOW

You need not wait longer—the efficiency sets are available.

UNIVERSAL RECEIVING SETS

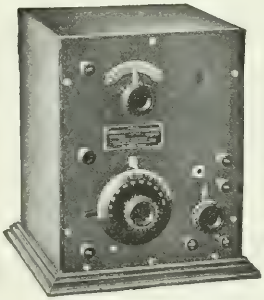
Our "UNIVERSAL" RECEIVING SET consists of the necessary tuning elements, a detector unit and two stages of Audio amplification, all assembled in a highly finished quarter-cut oak cabinet. The "B" batteries are also placed in the cabinet. This set will respond to wave lengths 180 and 20,000 meters. HONEYCOMB COILS are used for inductances associated with high grade condensers having Vernier attachments.

Owners of these sets are breaking long distance receiving records.

"SC-10 RADIO RECEIVING SET

Our "SC-10 RADIO RECEIVING SET is a short wave length regenerative set designed for those who would rather purchase a single unit and add one to our type "S" two step Audio amplifiers later on. This set is very easy to operate and is similar in type and equal in quality to the American best sellers.

We will be pleased to send you, on request, a copy of our R30 BULLETIN, which gives full information on our radio equipment.



"SC-10" Radio Receiving Set

Dealers write for information

CANADIAN INDEPENDENT TELEPHONE CO., LIMITED

OFFICES: 212 King Street, West **FACTORY: Wallace Ave., TORONTO**

WESTERN DISTRIBUTORS:

Radio Corporation of Winnipeg, Winnipeg, Man.
Radio Corporation of Vancouver, Vancouver, B.C.
Radio Corporation of Regina, Regina, Sask.
Radio Corporation of Calgary, Calgary, Alta.

ALPHABETICAL LIST OF ADVERTISERS

Acme Electric Supply Co. 30
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United Mfg. & Distributing Co. ... 70

Ward Leonard Electric Co. ....
Walker & Sons, Hiram 76
Wagner Electric & Mfg. Co. ....

Rubber Covered Wires and Cables

FOR POWER, LIGHT AND TELEPHONE WORK

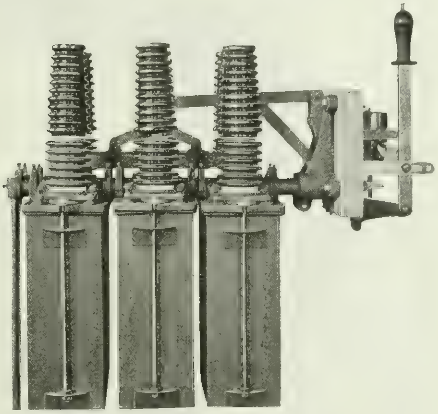
Incandescent Lamp Cord, Flexible Switchboard Cables, Special Cords and Cables for all kinds of Electrical Work.

Prompt Shipments from Canadian Factory.

BOSTON INSULATED WIRE & CABLE CO., Limited

Canadian Office and Factory, HAMILTON, ONT.

Monarch Oil Circuit Breakers Have Many Outstanding Advantages



Monarch Type M-7, Form "P", Oil Circuit Breaker

All **Current Carrying Parts** are generously designed and Moving Contacts employ only low Current Densities for all ratings. As a result Temperature rises for full loads will not exceed the standard limits for this characteristic.

All **Structural Parts** are as simple as possible and only the best workmanship is embodied in them. Their general construction makes installation and operation easy and reliable.

The **Rupturing Capacity** of the various types more than fulfils the demands of operating service for the various sizes due to the especially rugged construction of Monarch Equipment.

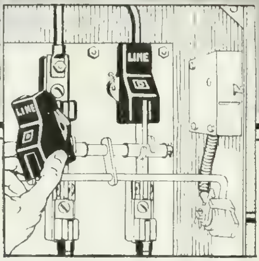
Monarch Oil Circuit Breakers are operating daily under some of the most trying conditions on the largest systems of the Dominion.

The Monarch Electric Company Limited have specialized in the manufacture of Electric Switch Gear for the last fifteen years and will be glad to quote you on any of your requirements for this class of equipment.

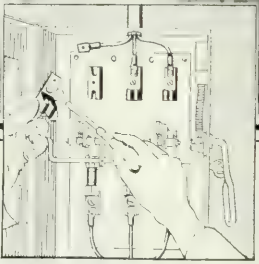
Monarch Oil Circuit Breakers are All-Canadian-Made

Monarch Electric Company, Limited

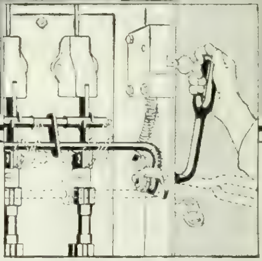
St. Lambert **District of MONTREAL**



Protective covers for line terminals prevent shocks and shorts. Optional equipment



Individual bases permit removal of any blade or jaw in three minutes



Powerful quick make and quick break mechanism enclosed to prevent clogging by dust, etc.

SQUARE D

MAKES ELECTRICITY SAFE

Only if You Have a Key

Can You Open The Cover When The Switch Is On

The Square D patented cover control of the 80000 Series embodies, for the first time on any switch, every feature ever demanded of a safety switch.

When the switch is on, the cover cannot be opened; when the cover is open, the switch cannot be closed—*except by one who has the Square D key!* This key permits inspection of the switch without interrupting the circuit, and operation with the cover open. Or it will lock the cover permanently shut, whether the switch is on or off. This not only provides absolute safety, but prevents unnecessary stoppage of machinery when inspection is necessary.

Replace a Blade in 3 Minutes!

All current carrying parts can be quickly replaced from the front of the box because they are mounted on individual bases of moulded insulating material which will not break. Installation has been made easy; first, by allowing ample wiring space at top and bottom of the box; and second by Easy-Wiring end plates with knockouts or bushings to accommodate any kind of conduit or open wiring. Electricians appreciate these two time and labor saving features.

New Type of Crossbar

The insulated steel crossbar of the 80000 Series provides strong and rigid construction. It cannot warp out of alignment—or char or split; Square D Multi-Spring Jaws have three tension points to maintain positive contact even with blistered blades; and the powerful quick make, quick break mechanism snaps the blades home sharply and completely. Located inside the box, it is protected against dirt and grease which might retard its operation.

The Ultimate Switch For Every Use

It is possible to obtain safety switches embodying some of the features of this new Square D. But no other switch has them all. No other switch is so adaptable for every conceivable use or gives such complete and lasting satisfaction from every standpoint. Write our nearest office. A representative will bring a switch and show you its superiorities.

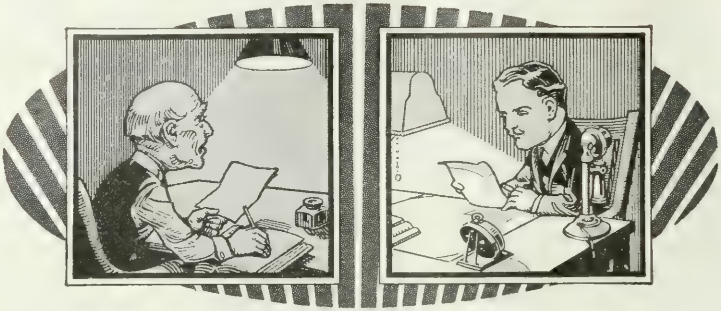
SQUARE D COMPANY, Walkerville, Ontario, Canada
Sales Offices at Toronto, Montreal, Vancouver and Winnipeg
(15)

SAFETY SWITCH

FOR EVERYONE

COPYRIGHTED 1922 BY SQUARE D CO.

SQUARE D KEY
FOR AUTHORIZED PERSONS ONLY



Why Don't You Use Carbon Filament Bulbs?

CARBON filament bulbs were satisfactory forty years ago. There was nothing better available. Billing your customers for current without considering their measured demand was also proper at that time. But today, we have mazda bulbs and the Lincoln Maximum Demand Meter.

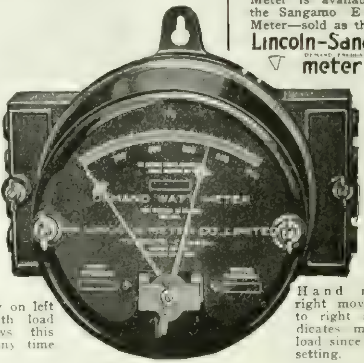
The Lincoln Meter tells you the maximum demand of each consumer every time his meter is read. This reading and the readings of other customers enable you to distribute your fixed charges equitably. Each customer pays for his service in proportion to the cost of producing that service plus a legitimate margin.

Modern business has established many different kinds of manufacturers. Because each one uses current differently, each should be billed by a modern **method**—on a demand basis. With Lincoln Maximum Demand Meters you can measure their demand either to a watt base or to a volt-ampere base considering power factor. Write us for any information—no obligation.

Write for the section or (sections) of the Lincoln Meter catalogue which interests you. SECTION I is a non-technical treatise on why demand should be measured; SECTION II, the technical treatise on demand measurement; SECTION III, Installation; SECTION IV, the Lincoln Graphic Demand Meter; SECTION V, the Lincoln method of Volt-Ampere Demand Measurement (Power Factor recognition); and Section VI, the Lincoln Split Core Transformer and Demand Ammeter.

The Lincoln Meter Co., Limited
72-74 Stafford Street, Toronto, Canada
Cable "Meters" Toronto. Phone Trinity 1374

The Lincoln Demand Meter is available with the Sangamo Energy Meter—sold as the
Lincoln-Sangamo
DEMAND ENERGY
meter

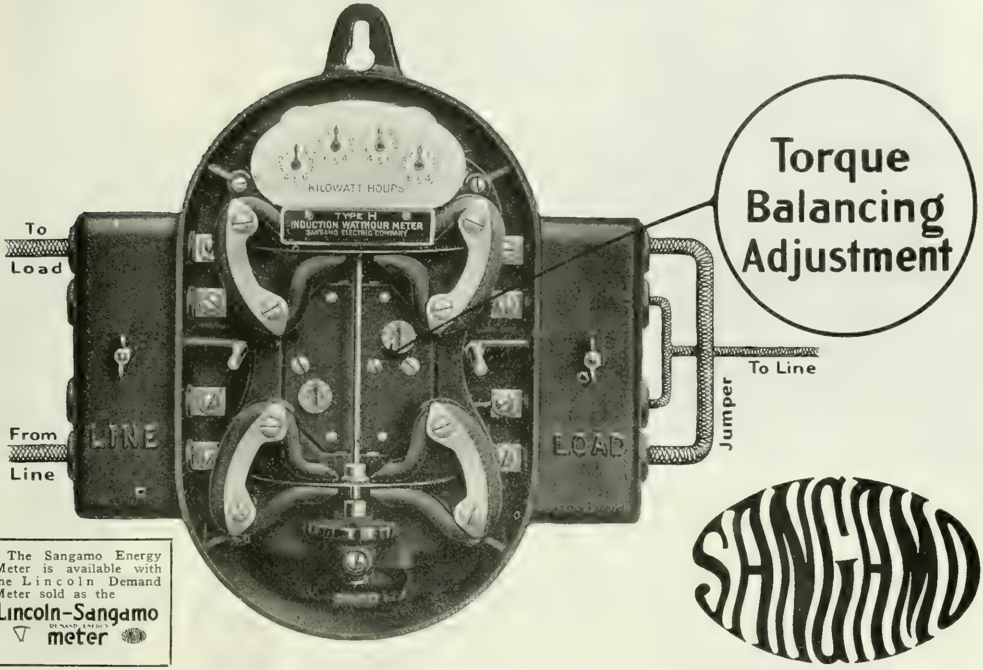


Hand now on left varies with load and shows this load at any time of day.

Hand now on right moves only to right and indicates maximum load since last resetting.

Lincoln
MAXIMUM DEMAND
meter

Sangamo Torque Balance of Polyphase Meter



The Sangamo Energy Meter is available with the Lincoln Demand Meter sold as the

Lincoln-Sangamo meter

SANGAMO

Sangamo design permits an instant balance of the two elements for torque in Polyphase meters. It is only necessary to buck the elements with a "Jumper" as shown. Loosen two clamp screws of the plate and turn the torque balancing adjustment screw until disc movement ceases. This adjustment varies inversely the magnetic air gaps of the two elements until correct balance is obtained. This important adjustment, so troublesome in many types, is extremely simple and positive with Sangamo Polyphase meters.

Our nearest agent can give you many other reasons why type "H" Polyphase meters should be on your lines. Bulletin No. 5518 describes them.

Sangamo Electric Company
of Canada, Limited

Factory: TORONTO **Head Sales Office:** MONTREAL

Banfield Adjustable-Lite

The handy lamp with many uses. They are made of solid brass in three finishes Brushed Brass, Bronze and Nickle, very durable, handsome in appearance, stands 12 inches high, with 5 inch by 3 inch base which is made in the form of a clamp, felt lined so as it will clamp on highly polished furniture without scratching or marring the finish. The shade is 5¾ inch in diameter. A new type Levolier lever socket is used and an eight foot cord with plug is attached to every lamp. Secure your Christmas supply now, your favourite jobber has them.

Western Representatives:

Cochrane, Stephenenson & Co. Ltd.
Winnipeg - Vancouver

W. H. Banfield & Sons Ltd.
370-386 Pape Avenue - Toronto

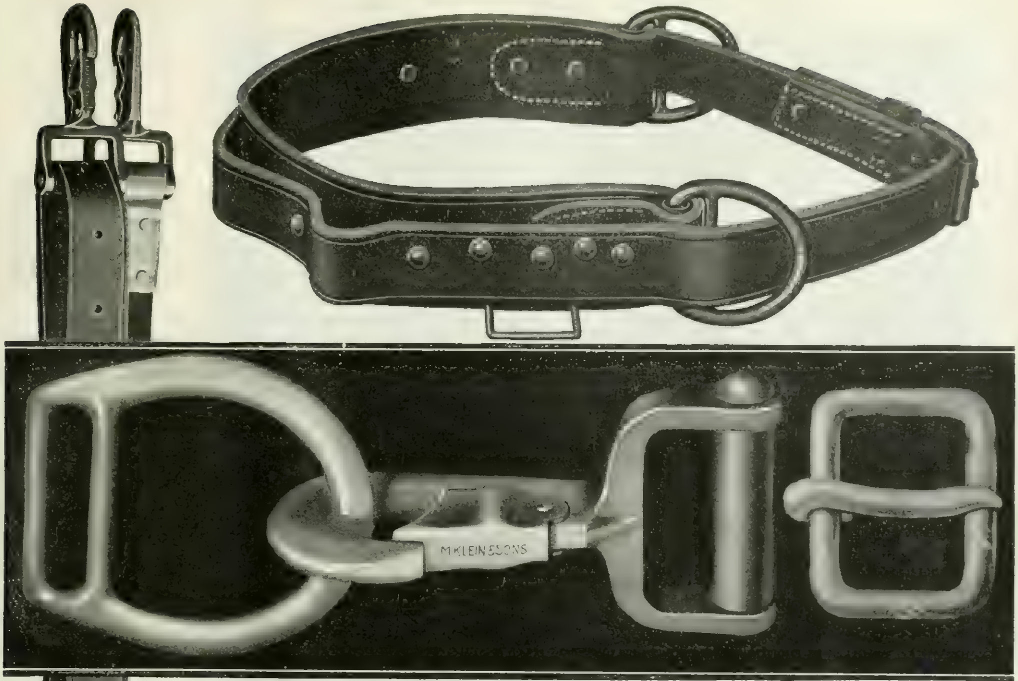
DUNCAN

Model M 2

Duncan Model M-2 Watthour meters are made with an accuracy that is considered remarkable by experienced meter engineers. Their variation under the changes taking place in every-day use is unusually small, and they retain this character of performance over very long periods.

We are glad to demonstrate the superiority of Duncan Meters, or we will send you bulletins describing them fully.

THE GEORGE C. ROUGH SALES CORP'N. 134 CORISTINE BLD'G. **MONTREAL**



"Safety First"—
Drop Forged Hardware!

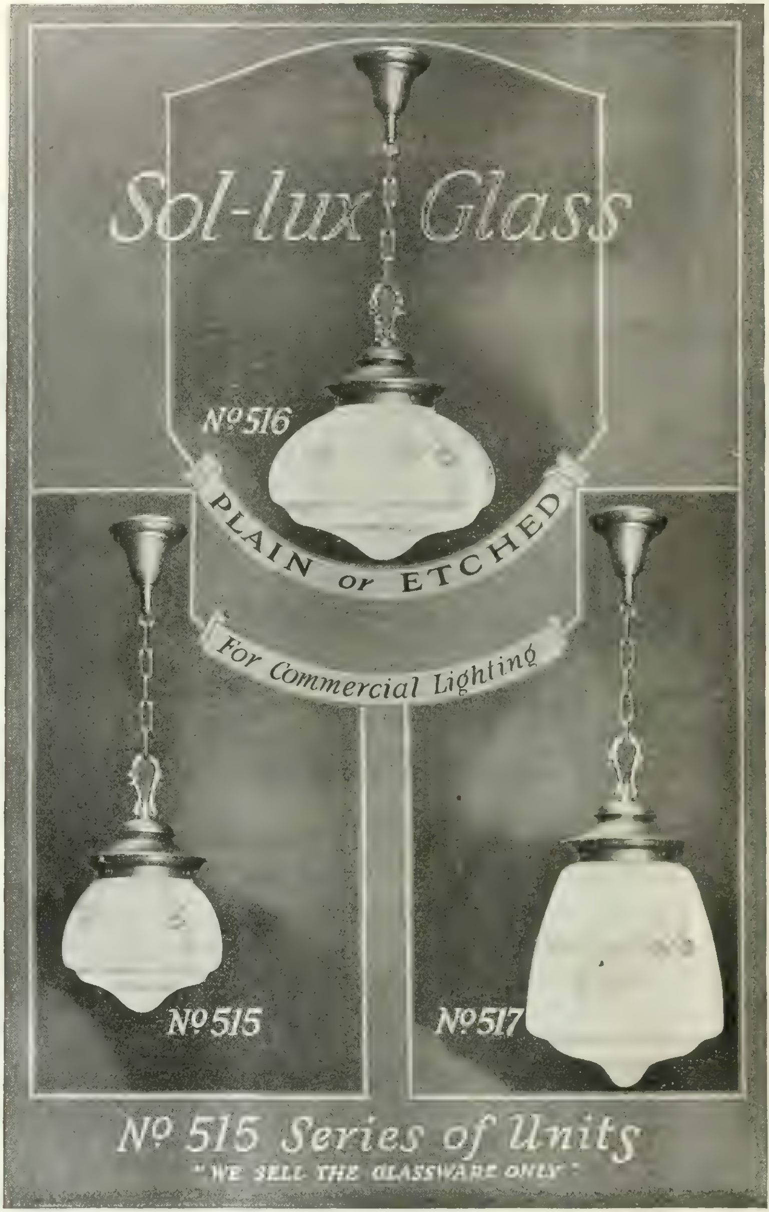
It's a fact! From now on Klein Tool Belts and Safety Straps will be equipped with solid drop forged tested hardware at D rings, snaps and buckles! And this big improvement won't make them cost a cent more!

It makes them safer yet! Over size, over strength, solid copper riveted and sewed throughout, reinforced at D rings and snaps with copper safety liners, made from the finest oak tanned harness leather—the "old timers" take no chances—they use Klein's!

Mathias KLEIN & Sons

Established 1857

Chicago Ill USA



515 Series Etched

These units are very popular because of their adaptability and low price.

Supplied in Sol-lux Plain, E166 White, Ivory or Grey.

Prices and Particulars on request.

Jefferson Glass Company Limited

Factory & Head Office: 388 CARLAW AVE., TORONTO

Down Town Showrooms 164 Bay Street, TORONTO

285 Beaver Hall Hill, MONTREAL, 272 Main St., WINNIPEG, 510 Hastings St. W., VANCOUVER

To Our Customers

ANOTHER year has passed since the directors, officers and staff, of the Canadian General Electric Co., Limited, had the pleasure of extending to you the Compliments of the Season.

* * *

Appreciative of the friendship and co-operation of our customers during the past year, we pledge ourselves to do everything in our power to further the interests of the Electrical Industry in 1923.

* * *

On behalf of our branch managers and their respective staffs, located from Coast to Coast, may we once more wish the Electrical Industry, a Happy Holiday Season and a Prosperous New Year.

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

We Wish You a Busy Christmas
And a Still Busier New Year

WE sincerely trust that the holiday season will prove to be the most profitable you have ever experienced.

Hotpoint

Electrical gifts are no longer novel—everyone is giving them—they are still up to date. And no electrical appliances lend themselves so well, in this capacity, as "Hotpoint Servants for the Home"!

A display of Hotpoint appliances cannot help but attract attention; even the slightest effort to secure business, by merchandising Hotpoint devices, will bring generous results.

Christmas is the Best Season Of the Year to Attract New Trade

THIS is one of the very best reasons why you should make absolutely sure, that the appliances you sell will be a lasting advertisement for your store. Be on the safe side and sell "them."

Hotpoint

Servants for the Home. Remember one reliable electrical appliance sells another. Therefore, make sure that you introduce yourself, to your new customers, by the new means of merchandise beyond reproach.

Hotpoint appliances will make money for you this Christma because they are nationally advertised—have the confidence of the public, and are manufactured up to a standard, and not down to a price.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Not even hands are required to operate the NEW C·G·E TUMBLER SWITCH

HERE'S a switch that responds to the sweep of a hand across the wall —no fumbling around to find the right button. The C.G.E. Tumbler Switch works like a lever, up and down, at the lightest touch. When hands are full, an elbow answers the purpose. And yet this simple device is so sturdy and reliable, that it never gets out of order.

C.G.E. Tumbler Switches are made in three styles. The flush type— applicable to every kind of residence, is finished with a black moulded handle, and has a very handsome appearance. The surface type is small compact, and unobstrusive in appearance. The all porcelain model, which is also of the surface type, is for use in damp places.

The fact, that the button is in one position for "off" and in another for "on" makes the C.G.E. Tumbler Switch self-indicating.

"Made in Canada" by

Canadian General Electric Co., Limited

HEAD OFFICE TORONTO

Branch Offices: Halifax, Sydney, St. John, Montreal, Quebec, Cobalt, Ottawa, Hamilton, London, Windsor, South Porcupine, Winnipeg, Calgary, Edmonton, Vancouver, Nelson and Victoria.

Electrical News
Generation, Transmission and Application of Electricity

For nearly thirty years the recognized journal for the Electrical Interests of Canada

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Orders for advertising should reach the office of publication not later than the 5th and 20th of the month. Changes in advertisements will be made whenever desired, without cost to the advertiser.

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Vol. 31 ***Toronto, December 15, 1922*** ***No. 24***

No Political Interference—Guaranteed by Dominion Government

The outstanding event of the past week was the arrival in Canada of Sir Henry Thornton, the new president of the Canadian National Railway System and his general statement of policy as outlined at his first public appearance at a banquet given in his honor by the Montreal Board of Trade.

It was not expected that matters of policy would be outlined at this early date, but that Sir Henry would take this first opportunity of enunciating the basic principles upon which the National system would be operated was naturally looked for. The definiteness of the enunciations will leave no doubt in the public mind on two points: (1) That he has already grasped the fundamentals and (2) that, having outlined his general plan, he will adhere to it.

What the people of Canada have been hoping and praying for is a man with sufficient ability and strength of character to assume just as absolute a dictatorship of the nationally-owned lines as is exercised, for example, by President E. W. Beatty for the C.P.R. The theory of national ownership is sound enough. The difficulties lie in practice. We must all recognize that in addition to the usual and inevitable problems to be solved in the administration of an enterprise of such dimensions and complexity—common to both private and government ownership—there are innumerable snares besetting the pathway of the man who is constantly being importuned, at the same time, to steer his course according to the dictates of this or that political or sectional influence. The people of Canada know by experience and it is gratifyingly evident that Sir Henry Thornton knows, that such a course spells failure.

* * *

Two main points were brought out in Sir Henry's address. The first was that he looked upon the Canadian National Railway System as differing, fundamentally, only in minor detail from the C.P.R.—the number of shareholders. Shareholders of the C.P.R. number thousands; there is only one shareholder of our national system—Canada. Further than this, his relation to his single shareholder was almost identical with Mr. Beatty's relationship to his thousands of shareholders—he had been given carte blanche, absolute administrative control.

* * *

The other point made by Sir Henry, and most emphatically made, was that there would be no political interference. His words in this respect are worth quoting:

> **"But let it be emphatically understood now—once and for all—that there is to be no political interference, direct or indirect, in the administration and working of the Canadian National Railways. I cannot put it any more forcefully without transgressing the rules of polite speech, and if I knew of any words which would make this point more clear I would unhesitatingly employ them. The prime minister has solemnly assured me that there is to be no political interference, and it was with this distinct understanding that I accepted the post which the government has done me the honor to offer. This assurance is the only assurance that any government, irrespective of political complexion, would be compelled to make under similar circumstances. It is vital to the success of our railways, and any other procedure spells inevitable disaster."**

Of course we have all heard this kind of talk before and we all know, in spite of such protestations, how fatal to many of our publicly owned enterprises the interference of "politics" has proven. Some way or other, however, Sir Henry looks, and his words are phrased, as if he means what he says. If he does, and if he has a sufficiently strong character to stand or fall on that declaration, he will find that irrespective of political inclinations, or racial or sectional aspirations, the people of Canada will stand behind his efforts and give him their moral support.

* * *

Another ray of sunshine shone in upon this eventful gathering in the statement by Sir Joseph Flavelle that there will be no operating loss on the Canadian National System this year. Not only will operating charges all be met but there will be a "substantial" surplus to apply to fixed charges. As Sir Henry Thornton expressed it, this is an evidence that the system will "respond to treatment."

From a national point of view we look upon Sir Henry Thornton's active assumption of the control of the Canadian National System as an epoch-marking event. Canada is in the making and whether, in the near future, she shall be counted "big" among the other nations of the world depends in great measure on her transportation systems. Thornton and Beatty hold the keys to the situation and Canadians look to them, and expect them, to make good.

Honor!

GREAT BRITAIN is going to pay to the last farthing irrespective of whatever any other debtor nation does. England moved first in the matter of debt settlement, even before the people of the United States realized that nearly half their war debt represented loans to the Allies. England moved promptly because she meant to pay and to collect from her debtors if possible.

The majority of people in this country do not understand the word "honor" as respects debts and endorsement as the English understand it.

If an Englishman introduces a friend to his tailor, it is as an introduction to his club; the introducer is responsible for any debt.

The tendency of this country is to regard the tailor, the butcher or the grocer, or the merchandiser of any sort, as indebted to the introducer for a new customer.

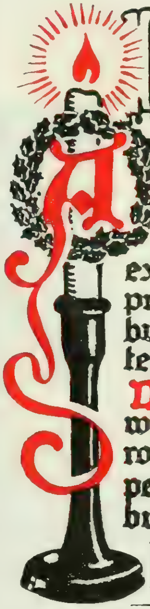
If bank officials or bank directors were held responsible for the introduction of new customers, larger salaries would have to be paid and business might be very much restricted.

One of the largest banks in New York was not long ago surprised because the youngest director on the board promptly stepped up and paid the debt to the bank of a young merchant who had failed.

The bank director said "I introduced this young man to the bank for credit, believing in his ability to make a success of his business. For a time he made a very decided success and appeared to be above the ordinary in the intelligent handling of his business. Then came the big shrinkage in values which swept him over. I believe the bank extended this credit because of my introduction and though I don't believe, generally speaking that directors should be financially responsible for bank introductions, I felt I had a personal responsibility in this instance, which I could not overlook.

Barron's Weekly (N. Y.)

Appreciation



And now, in the friendly spirit of a merry Christmas, accept this expression of appreciation for your business and courtesies of the past. May that light which illumines the road to health, prosperity and happiness burn steadily for you through all the New Year.

Hugh C. MacLean
Publications

The Application of Electricity in the Manufacturing Industry--12

Flour Mills' Electrification Rapidly Increasing —Other Types of Drive Unsatisfactory on Account of the Care Necessary in Manufacture

The modern flour mill is built for the purpose of converting grain-stuffs into flour. Present day mills range in size from those which convert only a few barrels a day to those having a daily output that ranges well into the thousands; regardless of their capacity, however, the operations performed are practically the same.

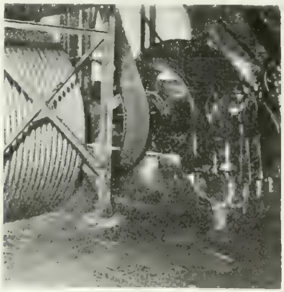
The processes employed involve a seeming multiplicity of treatments, but the main objectives may be classed as cleaning, tempering, separation of middlings and reduction to flour. These operations are all of a semi-automatic nature, and the product is not touched by human hand from start to finish, being passed from operation to operation through spout conveyors.

Electrification Increasing

The major considerations of operating costs and reliability are resulting in the electrification of increasing numbers of flour mills.. Such installations are demonstrating that in most cases a properly electrified mill or elevator can be operated at a lower cost per unit of product and with greater reliability than can be obtained with other kinds of power.

The majority of the smaller mills* are at present being driven by steam engines. Unless coal and labor are very cheap the steam engine is not particularly economical because little steam is used for process work and in most of these installations the size of the engine and available water supply does not warrant a condensing unit. This means a non-condensing engine and many dollars blown into the air in the form of exhaust steam.

It is usually the practice to use one engine to drive the entire mill. This means a great deal of heavy line shafting and if the alignment of bearings is not maintained if there are accidental distortions or imperfect lubrication, the journals become overheated and the fire risk is appreciably increased. With such an arrangement a large number of belts is necessary, the maintenance cost is high, and in addition there is a tremendous friction loss in the transmission system. These things naturally follow because a steam engine drive is not flexible and does not permit subdivision of the machinery into small groups.



Main shaft with ball-bearing installation

Steam Drive and High Insurance Rates

The ordinary steam engine drive makes it necessary to have a boiler room dangerously close to the mill or else to have heavy losses in long rope drives or steam mains. Unless this boiler room is installed in a fireproof building the insurance rating is increased—about 15 per cent in the case of stone or brick mills, and about 50 per cent in the case of frame buildings—above the rate for properly electrified mills. The engine room, boiler room and main transmissions are all unnecessary in a modern electrified mill.

A 50 h.p. induction motor suspended from ceiling—driving chop mill

In mills driven by water power the more evident disadvantages are limited capacity, requiring sooner or later to be supplemented by some other power, reduced capacity or possible shut down during the dry season due to lack of water, and in some cases similar trouble in flood seasons due to back water in the trail race. In such mills the speed regulation is generally poor and the power losses in heavy main transmissions, the high maintenance costs of belts and ropes and the difficulty of enlarging the mill have caused many of these water-driven mills to adopt electric completely or as reserve for break-down service.

Advantages of Electric Drive

Where electric motors are used it is possible to divide the machinery into groups and do away with the main heavy transmissions. The fire danger is reduced because there are fewer bearings to overheat and no flames for explosive dust to come in contact with. The receiving or cleaning machinery may be operated without driving the flour milling machinery and the packers, conveyors, car pullers, pumps and fans are only operated when there is actual need for them.

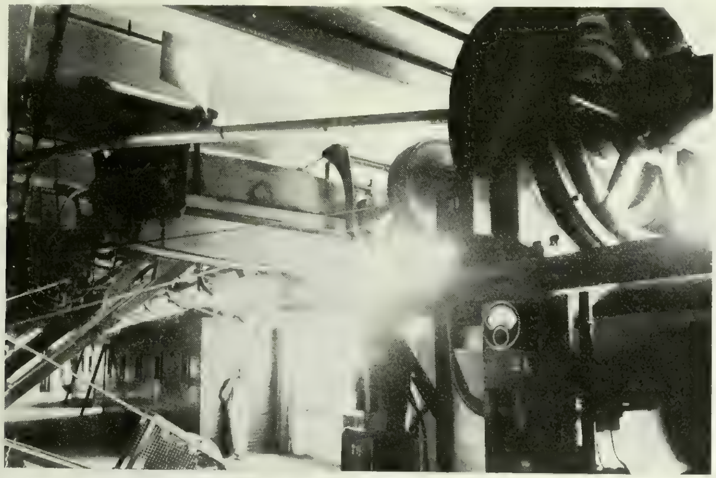
The saving in power, which would otherwise be lost in belts and shafting, is evident. When additions are made to the mill, the new machine can be set up and connected to its own motor without in any way interfering with the operation of the original equipment. In mills grinding both flour and miscellaneous feeds it is easy to operate only one part of the mill without driving all of the shafting in the other parts and without running the main engine at a small percentage of the load at which it is rated.

It is estimated that a speed variation of not over two per cent is the limit for mills producing the best grades of flour. With properly grouped electric drives, belt slippage is eliminated to a great extent, and the milling machines are kept more closely up to their proper rated speed, thus increasing output as well as improving the quality of the product. The speed of the motor can be kept constant so that the danger of slowing down and choking is practically eliminated.

Provisions for Stopping Previous Operations

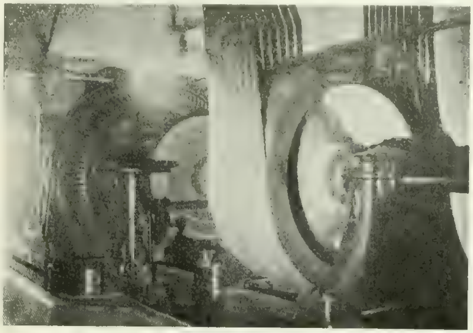
Since the milling process is continuous, provision must be made so that if any machine, elevator or conveyor stops, all previous operations in the sequence will stop so as to prevent choking the system. The milling machinery may all be driven by one motor or the control of a number of motors may be brought to a common panel and wired so that all motors in a group will start at once or in their proper order, and so that if one motor stops all other motors preceding it will stop also. This arrangement is very simple and with it the mill can be started up in much less time than is the case with a steam driven mill. Push button stations may be located at convenient points so that an entire mill section may be stopped by simply pushing a button at any one of them.

In the grain elevators, electric drive is particularly applicable. The motor or motors can be located close to the machinery, again cutting down belt expense and power losses in transmission. Ordinarily motors are supplied for each elevator leg, car puller and exhaust fan, while the cleaning machinery such as separators, small screw conveyors, dust collectors, etc., when compactly grouped are driven together by single motors. Motor driven fire pumps may be made to operate automatically or be manually controlled from a distance. It is unnecessary to maintain steam continually for these operations; the motor is not dependent upon the location of boilers and steam pipes, and may therefore be installed at the most favorable location for the work it has to do.



Quaker Oats' Plant, Peterborough, Ontario—400 h.p. ball-bearing motor, direct connected to lineshaft

Practically all motors used in flour mill work are of low or moderate speed and are designed for constant speed service. If a single motor is used without a friction clutch for a group drive it should be of the slip ring type, if alternating current, or compound wound direct current, but if a friction clutch is used the motor may be either of the synchronous or squirrel cage type. The most common arrangement for group drives is the use of the squirrel cage motors with a friction clutch where that is necessary.



A 600 h.p. 2300 volt synchronous motor with rope drive

The use of motors not only reduces the friction loss but cuts down the first cost of shafting and belting, reduces the labor costs of maintenance, replacement and repairs, and results in cleanliness and safety in operation beyond that obtained with other drives.

An electric motor is comparatively compact and it is not usually necessary to provide special foundations for the sizes most generally used in flour mills. In case of new mills or elevators the adoption of the electric drive reduces the cost of building construction because it is not necessary to build engine rooms, boiler rooms or to provide supports for heavy line shafting, hangers and pulleys. The elimination of fire risk is evidenced by lower insurance rates for properly electrified mills.

An examination of many typical mills has disclosed the fact that, in the majority of cases, the illumination is very [illegible] only [illegible] low wattage lamps on drop cords placed where the light is desired.

The dust trouble has to be considered as a very important fator. Lighting units become rapidly coated with a dense layer of more or less inflammable and opaque dust. Some of the modern mills apply low wattage lamps in vapor-proof globes, using rigid mountings. This secures fairly good illumination, but this practice is not universal, and there is a large field in this industry for the use of higher wattage lamps in conjunction with vapor-proof globes equipped with reflectors and, where necessary, guards affording protection from mechanical injury.

Evidences of the advantages and satisfaction of electric drives are not hard to find. Here is the opinion of an Ontario flour miller:—

Mitchell, Ont.

Editor, Electrical News:

Electrical motor drive was installed in the mill here in October 1911—two motors, each 50 h.p., one on the flour mill and one on the chopping plant. Thic makes it possible to run each unit separately if desired. The motors have been in constant use ever since and have not cost one dollar for repairs. They are placed on a cement foundation and belted to the main shaft of each section. They are very convenient to start, no delay to raise steam or clean out racks or cut ice (if using water power). The uniform motion makes the electric drive particularly desirable for flour milling because many of the separations are made with suction fans and any change in speed affects the separations and consequently the results. The one draw-back is that the current may go off suddenly and stop the mill without warning, which does not leave it in good shape for starting again.

Yours truly
Stuart Bros. Ltd.

Possibilities of Electrification

At the present time there are in Canada 1,332 individual flour milling plants. These are distributed by provinces, as follows:—

Ontario	617
Quebec	457
Alberta	58
New Brunswick	50
Saskatchewan	45
Manitoba	44
Nova Scotia	32
Prince Edward Island	24
British Columbia	5

The most recent figures available as to the amount of capital invested in the industry show a total of $68,838,927. Of this amount $15,068,491 is represented by machinery and tools. With complete electrification of mills, it is apparent that a large part of this latter figure would represent electrical machinery.

Some indication of the extent to which steam power is used is furnished by a knowledge of the fact that 88,552 tons of coal were used in one year to raise steam for power purposes in this industry. A tabulated form showing the use of various fuels for steam raising purposes for one year is as follows:—

Expenditures for Fuel in Flour Milling Industry

Coal (all kinds)	$552,160
Gasoline	27,000
Wood	45,000
Other fuels (gas, etc.)	42,000
Total	$666,160

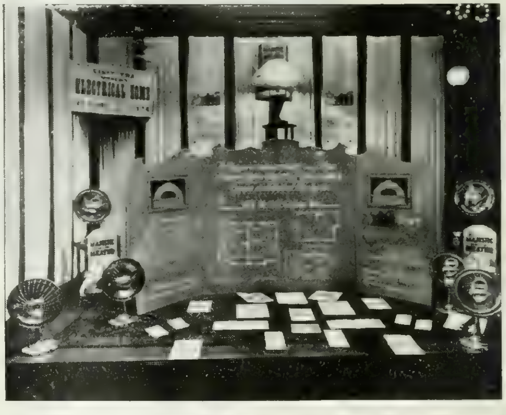
It must, of course, be considered that in some cases, electricity is generated with the fuel expenditure. A better idea as to the extent of electrification is given by the following table

Kinds of power used	Number of units	H.P. according to manufacturer's rating	H.P. actually employed
Boilers	231	15,828	12,706
Engines, steam	227	15,871	14,921
gas	47	5,134	2,696
gasoline and oil	181	3,331	3,202
Waterwheels or turbines	1,134	44,106	37,029
Water motors	8	321	295
Electric motors	1,135	50,812	38,220
Other powers, not specified	4	270	100
Total Power	2,736	119,845	96,463

The power employed in the industry is shown by kinds or classes in the power statistic table, according to (a) the number of units of each class, (b) the total horsepower according to manufacturers rating, and (c) the horsepower actually employed.

A consideration of the figures given above cannot fail to show that there is a large field for electrification in the flour milling industry. The conversion is coming, but slowly. A campaign of education, the exposition of the lower costs made possible by electrification, will hasten the process. The miller must be shown that the simple construction and high efficiency of the motors used insures the closest approximation to maximum, overall efficiency, and consequently insures a minimum of wasted power.

An automatic electric sub-station is to be built immediately by the B. C. Electric Railway Company on Bodwell Road at a cost of $65,000 including equipment. It will house the usual transformers and a rotary converter of 1,000 kilowatts capacity, supplying the railway lines of South Vancouver with current at 550 volts.



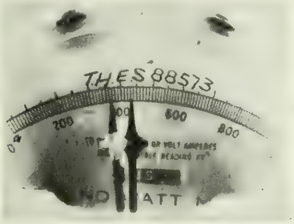
A window-full of suggestions for the man and woman planning a new home. The secretary-manager of the Montreal Electrical Contractor-dealers' association will advise regarding general plans, wiring, outlets and fittings so that the home may contain a maximum of comfort and convenience.

Photographic Method of Meter Reading Prevents Disputes With Customers

New System Includes Photographs of Each Meter Face—Quickly Taken—System Engenders Goodwill—Many Savings Involved

An innovation in meter reading, by means of which a photograph of each meter face is taken, has been recently adopted by the Toronto Hydro-electric System. So far, this system has only been used on demand wattmeters, but it is quite applicable to any meter on the company's lines. The great point of the system is that the meter is read with photographic fidelity, and an indisputable record is brought to the office files. There have been no disputes in this case, but if such should occur, the records are at hand, being the means of transporting monthly to the office shelves all the meters on the company's mains.

The photographs are taken with a special camera, equipped with an anastigmat lens of short focus, a simple automatic shutter controlled by the operator, making exposures with varying speeds as fast as one-fifth second, and lamps for furnishing light for the exposure. The actual photo is obtained with the front of the camera against the meter dial and pressing downward on the exposure lever. This action automatically turns on the light, opens and closes the shutter and turns off the light. This shutter, with each exposure, automatically locks until the film for the next exposure is wound into place. This prevents the possibility of a double exposure; that is, the superimposing of one exposure upon another. Likewise there are no blanks, for the film cannot be wound off until the exposure has been made. Winding reel and exposure level are mutually interlocking, thus eliminating the possibility of error from forgetting to turn the key or from turning the key before the exposure has been made. Identification of the meter is obtained by stamping on the outside of the glass dial the meter number. The light is furnished by two four-cell dry batteries stored in either side of the camera, supplying current to four 3.8 volt Mazda miniature lamps.



A typical reading on Toronto Hydro-electric System

The exposure is recorded upon a special sensitive emulsion coated on a paper support and by a reversing feature in the camera a positive reading is obtained direct from development, which does away with any necessity of making prints from the exposures. The exposures are 1½ by 2⅛ inches and are spooled in the familiar daylight loading cartridge form with 75 exposures to each roll. When the last exposure has been made the shutter, by a special cut in the film, remains locked until the film is wound off and a new spool has been inserted.

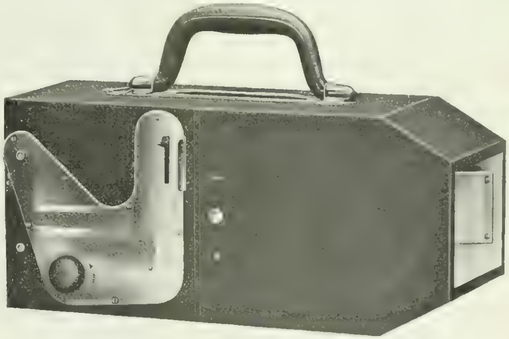
A small drawer is provided in the front of the camera to carry five extra lamps and the camera is equipped with a convenient, reinforced handle. By pressing a small button that is located just below the exposure lever the lights may be turned on, converting the camera into a "flasher" for locating meters or finding one's way through dark cellars.

The development is the simplest part of the whole operation and any one of the meter readers can do the developing for the whole field force. After winding on racks the films are immersed in the developing tanks, where they remain for two minutes and after development are rinsed and then immersed in the fixing tank. After fixing and a short rinsing they are slipped in wall racks for drying. When dry they are re-spooled and are then ready for the bookkeepers.

The fact that the developing, fixing and rinsing are all done on the one rack, greatly simplifies the operation, so that on an average only three minutes are necessary for each roll. As all developing can be most economically done at night, no expense is necessary in the way of dark room equipment—any blue print room or other room with large sink affords the necessary facilities.

The adoption of this system shows customers that the power company is endeavoring to obtain the most accurate readings possible, and engenders a goodwill and confidence that is a desirable asset.

It is claimed that some expenses are eliminated by this system. Such items as the annual cost of heading up the meter readers' lists, the annual cost of flash lights including lamps and batteries, the actual time spent in re-reading doubtful meters, and from the elimination of complaints, may be counted on the saved side.



The Factograph Camera

The fact that some meters are above sight level beyond the reach of the readers from the floor may seem objection, but statistics show that the majority of mistakes in reading are made in these "skied" meters.

The cost of using this system varies with the different companies, depending upon the number of meters read, the size of the reading force and the number of days consumed in reading.

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*From information supplied by T. R. Flint, Toronto Hydro-electric System.

Are Cooking and Water Heating Desirable Additions to Station Load?

Claim is Made That Diversity Factor is Much Greater than Generally Supposed

By W. F. CLARKE*

During the past few years there has been much doubt and discussion among central station managers as to whether the electric cooking and water heating load should be encouraged. A lack of accumulative, definite and convincing operating data indicating the practical diversity and actual station, line and transformer capacity required has contributed to this feeling. The energy required per customer has also been a somewhat indefinite quantity. Central station men as a whole, due to their lack of experience and definite knowledge of the cooking and water heating load, have not considered it safe to trust the figures as to diversity. There has also been a general fear that development and experience would demonstrate that electric cooking would be either too expensive to the customer or so costly to the distributing company as to make the load undesirable.

More extended experience, however, has demonstrated that where the cooking and water heating load is developed to any considerable extent, the resulting diversity is much greater than generally believed possible. In fact, with any considerable development of cooking and water heating load on the generating station and general distributing system, this diversity, in terms of maximum capacity of the stoves and ranges, is not less than 1 to 8 and in many cases in excess of this figure. In groups served from a single transformer where three or four electric ranges are supplied it seems safe to allow one-fourth to one-third of the connected range load as the transformer capacity required for combined lighting and range load. If several water heaters are to be installed with a double-throw switch so that cooking and water heating demands are not coincident, possibly three kilowatts per range should be allowed.

Transformer Capacity Per Range

The Washington Water Power Company of Spokane, Washington, which has had much experience in servicing electric ranges, is reported to allow but two kilowatts per range to cover necessary transformer capacity. On the other hand, the Puget Sound Power & Light Company, with a smaller number of ranges, allows as high as three kilowatts per range. It will be noted that on the Washington Water Power Company basis of only two kilowatts, 25 per cent of a range rated at eight kilowatts maximum is allowed as the effective individual demand.

The concensus of opinion of those who have operated a large number of ranges indicates that where several ranges are grouped on the same transformer this allowance is sufficient. The fear that on the average the lighting load would materially lap over the cooking load seems to be unwarranted by actual operating data. Unlike the motor load the range load, due to constant resistance, with reduced voltage decreases the ampere flow and consequent heating effect on the transformers and operates at practically unity power factor. This, with the diversity from several services, usually safeguards transformers against overloads.

High Practical Diversity

While it is true that it may be possible to operate an individual range at maximum rated capacity, in fact this condition seems seldom to occur and is safeguarded by the diversity if several customers are served from the same transformer. While we might expect that the general customs of the community would regulate the times of usage, further experience indicates that there is great variance in time of usage by individual families resulting from the variation in personal habits, day to day needs and resulting working methods. This variation is much greater than anticipated and no doubt has much to do with the high practical diversity which is being demonstrated by the records obtained where a comparatively large number of stoves have been installed. These effects are well illustrated in the recent report of the Merchandise Sales Bureau, Commercial Section, N. E. L. A., at Atlantic City.

In the case of farm lines it is obvious that the transformer requirements for the range will need to be approximately equal to the maximum capacity of the range, although if two families are served from the same transformer this amount can be somewhat reduced. This requirement, however, generally applies only to the local service line and transformer which are only a portion although a considerable part of the total investment expense per customer.

Allowable Diversity Ratio

When we come to consider the resultant demand upon the substation or generating station and on the feeders between generating stations and center of distribution and for a reasonable development, in getting at necessary costs of service on the basis of maximum range capacity connected we can allow a diversity ratio of at least 1 to 8. In other words, if this part of the system, including generating plant, costs a total of say $265.00 per kilowatt, only one-eighth of this amount, or $33.00 per kilowatt of range demand needs to be considered in arriving at final costs for this part of the total investment required to serve the individual customer. It seems evident, however, that with a high development of town service the diversity may be much better than 1 to 8. In the case of the rural line the lack of local diversity can be safeguarded by a higher guaranteed minimum charge for the service.

The electric cooking and water heating business is a field of development in the electrical industry which is still so young as to be yet in the formative stage.

The most effective way in which to treat it, is to gather together and co-ordinate information as to the progress in development of this class of business during the past year, and profiting by past experience point the way to greater uniformity and encouragement of this business in the future.

Power Company Experience and Policies

It is evident from the reports received that most of the larger and some of the smaller power companies now see the possibilities and ultimate value of this load, but it would seem that many of the smaller and a few of the larger are still in doubt as to the advisability of encouraging it.

Many have established rates and regulations that make this load possible; some being very attractive and opening up a wide field, while others are such as to limit the field. On the whole, it would appear that substantial progress is being made in the education of the power company men as to the satisfactory results that can be obtained with present day cooking and water heating appliances, the great service that can be rendered the public, and the large increase in revenue possible by the building up of this service.

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*General manager, Automatic Electric Heater Company.

Possibilities of the Domestic Load

In considering the desirability of cooking and other possible household loads we should not overlook the fact that 80 to 85 per cent of public utility customers are residences and that if lighting alone were furnished on this service, the average annual usage the country over would not exceed 200 kilowatt hours per customer. In connecting up these residence customers for service it is evident that the utility makes a definite commitment not only for a proportionate part of the generating plant, distributing system, ,etc., and for meters and service, but the utility also assumes even for a lighting customer as annual cash expenditure of $7.00 or more per customer to compensate for individual service in the form of office labor, reading and maintenance of meters and ordinary service attention.

With the general application of the flatiron, toaster and similar devices which are now to be found in the majority of residences, there are occasional but not necessarily coincident individual demands on the service from 500 watts to 1,000 watts per customer. The effective local demand for a group of customers may, of course, be considerably less, due to the diversity incident to the various and non-coincident times at which customers utilize these devices.

It is probable that if we would confine the usage to lighting alone, the effective demand per residence would not exceed an average of 250 watts or less per customer. As various small cooking and heating devices are purchased and come into more general use, the kilowatt hours sold per customer will slowly increase even without special merchandising effort on the part of the distributing company, but this procedure is much too slow.

Lighting Alone Not Profitable

It is obvious from the above that when the supplying company connects up a residence lighting customer it cannot expect to profitably operate on lighting alone. This condition is especially apparent if we divide the sum of all the enumerated yearly costs by the number of kilowatt hours sold per annum for lighting only. It immediately becomes apparent that the high kilowatt hour charge in the case where lighting alone is served is more than justified. If, however, we can greatly increase the number of kilowatt hours sold per customer and without as greatly increasing the additional capacity required in transformer and services and even less in other portions of the system, it is evident that to obtain this additional business we will be justified in making a much lower rate for these additional kilowatt hours.

A central California company reports a revenue for 1921 of approximately $195,000 from the domestic and commercial electric cooking and heating alone. This company is one that fully appreciates the possibilities and is lending every encouragement to the building up of the heating and cooking load. On this system the customer has the choice of combining lighting, cooking and heating on one meter, or having the lighting on a separate meter. He is also permitted to include motors not in excess of 5 h.p. on the heating and cooking meter.

Ye Electrical House-Keeping Shop

The National Electric Heating Company give their dealers some very valuable sales' settings. The fire-place illustrated is one example. This particular picture is a photograph of the window of the "Electrical Housekeeping Shoppe" an attractive little store up on St. Clair West, Toronto. F. R. Goldsmith is the proprietor.

Electricity in Port of Montreal

Mr. T. W. Harvie, chief engineer of the port of Montreal, in a paper before the Engineering Institute spoke of the harbor development, which is virtually the story of Montreal's growth to metropolitan stature.

To-day it is one of the greatest grain exporting cities in the world, and though one thousand miles from the sea, due to its admirable position is a great inland port.

Among some of the newer features of the harbor Mr. Harvie spoke of a complete electric power plant which lights the entire port and from which power could be derived to electrify sixty five miles of harbor railway terminals, operated by the Harbor Board, and which will serve every shed, and berth, and provide access to every port of the harbor for all transcontinental railways in the Dominion. The electrification of the tracks is close to completion, when over 1,800 cars per day will be handled.

It is interesting to know that Montreal now has 7th place amongst the great shipping cities of the world, New York, Liverpool, London, Hamburg, Antwerp and Marseilles in the order named still standing ahead. It is hoped with the addition of the new cold storage plant at a cost of $2,250,000 to the harbor, and the gradual development of the Canadian and the American West to which Montreal is connected through a complete system of canal, river and lake navigation and through which a corresponding great increase of shipping is sure to come in cold storage exports the capacity of the harbor will better her present proud position.

Mr. Harvie, speaking of future developments, considered it was time to formulate a new plan covering a number of years which could be carried out in a systematic way.

"Electrons"

At a recent meeting of the Toronto section A.I.E.E., the speaker of the evening was Dr. J. C. McLennan, of the University of Toronto.

Dr. McLennan is a very simple manner showed, relatively, the size of an atom, explained how its mass was arrived at, and how each atom contained electrons or cathode rays, these electrons being negatively charged particles about 1/2000 times the weight of the smallest atom and revolving around a nucleus or positively charged electron at the centre of the atom. He gave the mass of the electron as 9×10^{-28} gram and that of the atom 1.64×10^{-24} gram.

He explained how the current in wires is carried by negatively charged electrons, how electrons are flying off heated filaments of metal all the time and that radium gives off electrons at ordinary temperature, being replaced in part by the electrons from the atoms comprising the gases in the air. In this way radium makes air a conductor.

He showed how electrons get an added mass from the ether as they are projected through it with high velocities and have no mass of their own except an electric magnetic mass. He showed how the nucleus of a lighter atom striking that of a heavier one is deflected.

The address, illustrated by experiments and slides was a revelation to those present and gave an idea of the importance of the subject and the amount of knowledge being gained of the structure of matter.

Power Developments in Northern Ontario

The Great Northern Power Company, formerly the Matachewan Power Co., are actively working on the provision of power in the Northern Ontario region. This company is placing on the market a new issue of $850,000 first mortgage 7 per cent sinking fund bonds, due in 1937. This initial bond offering is being made to cover the cost of installing the first three units.

The power sites of the company are so located that they are in a position to supply many of the camps north of the Cobalt district, including Porcupine, Kirkland Lake, Matachewan and Shining Tree, in the gold zone, and Gowganda in the silver producing zone.

Transmission lines are being erected by those mines with whom contracts are taken out. The mines bear the cost of the transmission system, which will be repaid to them through rebating a percentage of the cost of the power they consume.

In Matachewan and Shining Tree no Power is at present available, even for carrying on development work, as the result of which the development of the district is seriously retarded. The only power possible is steam, the cost of which is prohibitive. All the available power in the Porcupine field is taken up and there is a demand for a greater supply. Some steam power is being used which is said to cost from $300 to $500 per horse power per annum.

Production of Electric Steel

An interesting summary of the situation as regards the production of electric steel was recently made by the National Bank of Commerce in New York. It is pointed out that this particular application of electricity is a development of the last decade since in 1913 the world output was 170,000 tons. Today it is slightly less than 400,000 tons..

During the war a considerable impetus was given to the electric production of steel and in 1918 the total ran well over a million tons. This had dropped in 1920 to about 800,000 tons and in 1921 to about half this amount. Difficulty of obtaining figures for German and Eastern output renders a correct total in later years impossible.

Up to the outbreak of war Germany was the chief producer of electric steel. At the present time the United States would appear to be greatly in the lead, with Italy a close second. On January 1, 1922, there were close upon 400 electric steel furnaces operating in the United States with about half that number in Italy. Germany has at least 100, though the exact capacity and the exact output in the recent past is not known.

Canada has not been a prominent factor in the production of electrical steel though we are one of a group of eight countries where electricity is used for this purpose. As pointed out in the article to which we refer, production of electric steel in large quantities is only possible in countries having abundant water power. Judged on this basis Canada is scarcely figuring as prominently as she should do. It is one of the problems to be considered in connection with the further development of our immense water powers.

Prevention of Accidents

At a meeting of the Toronto Section A.I.E.E., on November 24, the subject discussed was "Modern Electrical Practice to Prevent Accidents." Mr. Wills MacLachlan spoke on the subject in general, referring particularly to Compensation Board awards for employees' resuscitation, electrical burns and low voltage shock. Mr. Amos spoke in connection with electrical stations and mentioned a number of items of good practice pertaining to kinds of equipment purchased and the layout of the equipment, as well as the building. In connection with industrial plants, Mr. F. R. Ewart pointed out that all up-to-date layouts included safety lighting cabinets, safety starting switches and wiring in conduit. The main item was proper maintenance by qualified parties and the education of industrial operators to leave all things electrical strictly alone. Mr. Brady spoke in connection with overhead lines and covered up-to-date methods of spacing, grounding, guying, buying poles, etc., according to specification.

Mr. Moffat took part in the discussion by giving a description of the propaganda being carried on by the Bell Telephone Company to prevent accidents. They had First Aid Classes; they kept prominent records of all accidents and expended much effort to bring home to as many employees as possible the cause of each accident and ways and means to prevent same in future. Mr. Frank Groome gave some insurance company records of accidents due to poor illumination and mentioned a number of definite cases to show how such accidents occurred. Mr. Wills MacLachlan with the help of Mr. Mulligan and Mr. Moat gave a demonstration of resuscitation by the Prone Pressure Method.

Contributions to the discussion were also made by Messrs. M. B. Hastings, W. Mulligan, W. Volkman, A. B. Cooper, H. C. Powell, Mr. Harris, R. B. Weir and E. R. Lawler, while the speakers replied to a number of questions.

Electrical Production of Fertilizers

By P. M. Dearle

An Italian electro-chemist has just patented a process which seems likely to be of considerable importance in the development of Canadian agriculture, aiming as it does at the economical production of fixed nitrogen from the air in the form of chemical fertilizers. The time is approaching when in Ontario and Quebec at all events our agriculturists will need to take a leaf out of their books of their French, Belgian or German cousins and to spend an appreciable sum annually in adding to the soil those valuable chemical salts extracted by constant cropping. The supply of nitrates for fertilizer purposes is divided for the most part between the vast natural deposits which are the monopoly of Chile and Peru and the output of the huge chemical works run on the dangerous expensive Haber process by the great German chemical trust at Oppau and Merseburg on the Rhine.

Signor Casale, in Italy, hit upon the simple but at that time entirely novel method of producing hydrogen electrolytically from water vapor and converting it—with nitrogen obtained also electrolytically from the atmosphere—into ammonia which is subsequently converted into ammonium salts of various kinds at a cost only one-fourth of that involved in Germany where comparatively cheap coal supplies are to hand.

Especially Applicable to Canada

The particulars of the process of manufacture have, of course, been patented, and rights are being disposed of for practically every country in the world in which hydro-electric power is available. A remarkable feature of the process is likely to be the utilization in the construction of the apparatus of a new alloy-steel, Vibrac—of English manufacture, which gives the necessary strength to withstand the explosions taking place in the course of the chemical reactions with a weight of material much less than would be possible if ordinary steel vessels were used.

Apparatus Light and Simple

It is claimed that the apparatus required for the Casale process can be made so light and simple that its installation at remote waterfalls in agricultural districts should be a matter of but small difficulty, thus affording farmers a locally-produced supply of artificial fertilizers at an expense of one-fourth of the production cost by the Haber method. and eliminating also the heavy charges for transport involved in bringing the fertilizers from port or factory to the centre of distribution. While the supervision of a fertilizer plant would necessarily involve the services of a trained electro-chemist, there is little doubt that in many parts of Canada where existing industries use hydro-electric energy intermittently, and there is consequently from time to time a surplus of power available for other purposes, the manufacture of synthetic ammonium fertilizers will be found a valuable source of revenue.

New Light Plant in Magnetawan

Daley Bros., Magnetawan, Ont., have installed a new lighting system in Magnetawan, Ont., a village situated on the Magnetawan River. The construction includes an open timber flume 150 feet long leading to a frame power house 16 ft. by 22 ft. in which is installed a 50 h.p. vertical type turbine, operating under an eleven foot head, belt connected to 75 kv.a. two phase, 2,300 volt generator. The generator is located in a separate room 14 ft by 16 ft.

The distribution system covers a mile of street with 2,200 volt primary 220 and 110 volt secondary. The distribution equipment includes two 5 kw. line transformers and 20 street lamps of 75 or 100 watt capacity, nitrogen type.

In a separate compartment adjoining the power-house the company also operates a 24 ft. Robinson grinder which is driven from the main turbine and serves the immediate district in grain grinding. This equipment was placed in operation on November 15 of this year.

Power Situation in St. John

The contract between the City of St. John and the New Brunswick Electric Commission for a minimum of 10,000,000 and a maximum of 15,000,000 kilowatt hours of electric current per year from the Provincial Development Commission was signed on November 24 by representatives of the city and the commission, payment not to begin until May 1, 1923.

As the recent outcome of the refusal of the New Brunswick Power Company to sell its entire plant and equipment at a price of $2,577,655.—sum set by the Supreme Court in 1920—the common council in committee decided to recommend to council, the establishment of a civic Hydro Commission, as authorized in the New Brunswick Electric Power Act, who will serve for a term of two years, to be composed of the following: Major Ronald A. McAvity, William Harding, F. S. A. McMullin, Herbert Phillips, John N. Flood, James Lewis, and A. M. Rowan.

British Industries' Fair

The Canadian Chamber of Commerce in London has decided definitely to take space at the ninth annual British Industries' Fair, to be held in London and Birmingham from 19th February to 2nd March, according to information received by F. W. Field, British Government Trade Commissioner at Toronto. The Chamber of Commerce will organize sections of the Canadian manufactures both at London and Birmingham and desire the co-operation of Canadian manufacturers in order to make their representation as comprehensive as possible. Applications for space should be sent to the British Government Trade Commissioner at Toronto.

Power Supply of Fort Saskatchewan

The Government of Alberta has recently purchased an engine and generator to be used for supplying electricity to the town of Fort Saskatchewan. The engine was bought from the Kipps-Kelly Company, Ltd., Winnipeg, and is a Vickers-Petters semi-Diesel type, 80 b.h.p., 2 cylinder, 300 r.p.m. It is direct-connected to one 50 kw. Canadian Westinghouse, 60 cycle, 2,300 volt, a.c. generator.

BETTER MERCHANDISING

Taking Our Own Medicine

A FINAL CHRISTMAS THOUGHT:—

During the next ten days the electrical industry of Canada will be united in one concentrated effort.

It will be directed at the general public.

BUY - ELECTRICAL - GOODS.

Just one thought:—

Who is the General Public?

Does it include you and me and every man and woman associated in any way with the electrical industry?

Surely! Then the admonition to you, personally, is: buy electrical goods yourself. Buy, within reason, nothing but electrical goods. Do your part to ensure that every employee in the industry, every wife, son and daughter, every father and mother of every man engaged in the industry, buys electrical goods. Use your influence with friends, relatives and acquaintances to have them buy electrical goods.

Boost for the general good of the whole industry.

Boost because it will make your own position, whatever it may be, more secure.

Boost, finally, because you are 100% convinced that there is nothing else under heaven so suitable, in every way, for Christmas presents as Electrical Goods.

BUY NOTHING BUT ELECTRICAL GOODS.

A Simple Accounting System For the Small Contractor

Jobs Must be Accurately Figured—Accurate Record Must be Kept of All Completed Contracts

By REY E. CHATFIELD,

Secretary-manager Electrical Co-operative League of British Columbia

There are a few bed-rock essentials that no successful contracting business can be carried on without. One of these is that jobs must be properly figured. This was explained in my last article. The next most important thing is that an accurate report be kept of all jobs done. This is nothing more nor less less than the basis of a simple bookkeeping system.

Job No.	Job Cost	Selling Price	Margin
1.			
2.			
3.			

This can be accomplished by listing all jobs completed each month on a form similar to that printed herewith.

At the end of the month you will have a record of the cost, selling price and margin on each job. By adding the margin column you will have the total gross margin for the month.

From this amount deduct the amounts spent for:—

1. Rent,
2. Salary for Management of Business,
3. Light,
4. Heat,
5. Telephone,
6. Automobile,
7. Office expense—(stamps, stationery, etc.),
8. Advertising,
9. Association dues,
10. Taxes,
11. Depreciation on tools and automobile.

These items are typical of some twenty items that go to make up the expense of running an ordinary business. Some may apply to your business, others may not; however, the larger number do apply to every business.

Then by deducting the total of these items from the total of the margin column you have the net profit for that month.

This system is by no means an accurate accounting system but, for the small contractor, will suffice to show in a rough way the monthly progress of the business.

And, Further—

There is no special connection between the foregoing and what I am going to say now, except that it is in the interest of the improvement of the electrical trade in general.

At the present time the public is being interested in electrical matters more than ever before by electrical home exhibits, co-operative advertising, and other means.

This opens a special opportunity for the electrical contractor. Now is the time to **quit skinning the job** and to **use salesmanship** to sell quality jobs at the right price.

A fair price and a first-class job—that is a better policy than using a pencil and paper trying to cut out this and that.

Vancouver Electrical Contractors and Dealers in Annual Meeting

Tuesday Evening, November 14, 1922 the Vancouver branch of the National Association of Electrical Contractors held their annual dinner at the Citizens Club.

The association attended one hundred per cent strong, and entertained as their guests Mr. Sidney Smith, sales manager of the Canadian General Electric Co.; Mr. W. C. Mainwaring, sales manager of the Northern Electric Company and Mr. Rey E. Chatfield, secretary-manager of the Electrical Service League of British Columbia.

After the dinner a regular meeting of the association was held for the election of officers for the new year. The following officers were elected:—

President—Mr. Earl Jarvis, Jarvis Electric Co., Secretary-Treasurer—Mr. Ralph Graham, Graham Electric Co.

Executive Committee—Mr. Wm. Jenkins, Jenkins Electric Co.; Mr. J. C. Reston.

Delegated to the Advisory Council of the Electrical Service League—Mr. Earl Jarvis, Mr. Ralph Graham, and Mr. P. F. Letts.

My Net Profits?

At the Recent Contractor-Dealer's Convention, C. D. Henderson Suggests the Slogan—"Nineteen-twenty-three Means a Profit for Me"

"Business Financing, is the subject for which I am down on the programme, but that is rather too extensive a subject to cover in the scope of a brief address, and I prefer to narrow my remarks down to one phase of the matter—Net Profits.

"I choose that subject because net profits are the most important element in business to-day. It is absolutely essential to the growth of any business. From another standpoint, also, it is most interesting, because Net Profits is the exact measure of the ability of an executive. It is his score in the game of business.

"I want to divide my talk into three sections: (1) Favorable factors; (2) Unfavorable factors; (3) A few suggestions.

Favorable Factors

"I notice that at this convention there does not seem to have been one word of optimism spoken as applied to the Dominion of Canada, but everyone of us should be thankful and proud to be living in this country at the present time. How many are there who realize that Canadian currency is the only currency that is at a premium in every country in the world at the present time. How many of us study trade conditions external and domestic. Exports are increasing, imports are decreasing. Two years ago our trade balance was against us. To-day it is in our favor. Then, think of the wonderful crop that is being harvested this year. It may not mean as much prosperity to the farmer as was hoped for, on account of the low price, but it is bound to set a huge amount of money in circulation.

Consider, again, the fact that there is no other country in the world that has as large a proportion of wired homes as Canada—numbering close on 800,000. The price of electricity is as low, or lower, than in any other part of the world. The class of work done can set an example to electrical men in foreign countries. As to the volume of business—from records available, it is estimated that within the next five years, there will be $200,000,000 spent in Canada through the electrical trades, $40,000,000 a year. There are very few other lines of business which can compare with this figure.

Unfavorable Factors

Now, with regard to the black side, for there is a black side. There are approximately 1,200 electrical contractor-dealers in Canada. According to Bradstreets, only 5 of these are rated at $50,000; 35 are rated from $10,000 to $25,000; 100 from $5,000 to $10,000; 200 from $1,000 to $5,000; 250 from $500 to $1,000; and 600 are rated below $500. Think of it! Fifty per cent. of the men in the business rated at less than $500.

It's not a very creditable situation. Whose fault is it? The greatest fault lies right with ourselves. It is the result of this cursed thing called price-cutting, which applies chiefly to wiring. The appliance manufacturer fixes a certain mark-up which is fairly well maintained, but when it comes to the wiring end of the business, the contractor is not making enough money.

The Jewellers' Overhead

We have been trying to drive home the fact that the cost of doing business in the electrical industry is 25 per cent, but there are some who think they can operate on 15 per cent. I was glad to hear the previous speaker's remarks on overhead, bringing out the fact that in the jewelery business overhead has been running from 32 to 39 per cent. It will help to impress some members of the trade with the fact that we are not overestimating when we place our figure at 25 per cent.

Now let us consider what the sale price of an article or piece of work consists of: (1) Materials and labor; (2) Overhead; (3) Profit.

We know our labor and material costs. For the purpose of figuring the overhead, let us take a sample business turning over $30,000 in the year. Now it has been proven from statistics and can be backed up that the overhead is not less than 25 per cent., which would in this instance figure out at $7,500. To this add 10 per cent. profit, or $3,000, making a total of $10,500. Subtract this from $30,000, and we are left with $19,500, which should be the cost of material and labor involved in doing a business of $30,000.

How to Figure the Selling Price

Next let us consider how to arrive at the selling price, given our labor and materials costs in the first place. This apple which I draw on the blackboard will represent the selling price. Now we will mark off 25% of the apple as overhead, and 10% for profit, totalling 35%, which leaves 65% for labor and materials. If the labor and materials cost $100, and this $100 represents 65% of the selling price, what is the total of the selling price. Well, we've got to figure it out, as 65 is to 100 so is 100 to 100 x 100 ÷ 65, which equals, approximately $154. Therefore, we have got to add 54 per cent. to the cost of our labor and materials in order to making a profit of 10 per cent.

Now what does overhead include? Here is a list of some of the things you have got to figure into it: Salaries (estimated at 10%), rent, light and power, bookkeeper, taxes, insurance, workmen's compensation, stationery, advertising, telephone, telegraph, etc., association fees, breakage, depreciation, bad accounts, auto expense.

Don't let us fool ourselves on expense of doing business. The lowest overhead in any line of trade is probably in the grocery business, in which they turn their stock from 10 to 12 times a year, and they figure at 18 per cent.

"1923 Means a Profit for Me"

Let's start 1923 right. Babson's motto for the year is "Bite off more than you can chew, and then chew it." For my own part I prefer, "1923 means a profit for me."

Following Mr. Henderson's address, some questions were asked. One member brought up the matter of the fixed price allowed by the manufacturers on electrical appliances. Could the 25% mark-up allowed be considered sufficient?

In reply Mr. Henderson pointed out that the manufacturers would scarcely be justified in allowing a higher margin on appliances to the contractor-dealer when it was obvious that he was not figuring a proper overhead into his wiring prices. Otherwise, it would merely afford opportunity for cutting prices, or on the other hand, the appliance end of the business would be made to carry the contracting.

The suggestion was also made by another member that the wholesalers should help out the association by offering extra price inducements to members as against non-members.

Don't Sell Electric Ranges—Sell Electric "Cooking"

A few pungent arguments by P. H. Fox whose years of Experience are Sufficient Guarantee of their value

Selling the Electric Range

It should be remembered that a satisfied range user is a good advertiser and will help sell another. A successful salesman must secure the confidence of the prospect before a sale can be made. Arguments and criticisms must be carefully dealt with; avoid injuring the opinion of the prospect. Care should be taken with prospects who have made a decision on a certain make of range, as any attempt to change a decided mind might ruin any prospect of a sale. He must be frank and diplomatic. Opinions, tastes, interests and viewpoints differ, so he must conform (ostensibly at least) to the prospect's ideas and make her think she is right. Have it in mind she is going to buy—one person often agrees in thought and opinion with the one talking to them. The salesman therefore must be confident of the sale. This thought in turn will breed confidence in the prospect's mind.

In reality the salesman is selling cookery, and the more he knows about it the more successful he will be. Bear in mind, the public never buy anything until they have learned everything possible about it.

Factors of a Sale

Two important factors of a sale are the actual demonstration of the range and its immediate delivery. Very often when a range has to be ordered from the manufacturer in a distant city and the purchaser has to wait a considerable time she loses her interest, thinks of something else she wants and wishes to cancel the order.

It is unwise for a salesman to criticise or disparage a competitor's range. All features are legitimate—all have a purpose and the salesman's company may adopt these features some day and make it difficult to overcome the things he has said.

The following features should be remembered by the salesman when selling:—

(1) The progress of electric cooking today.
(2) Practicability of the range.
(3) Advantages of electric cooking.
(4) Description of cooking rate.
(5) Lighting and cooking rate served with one meter.
(6) The economy of adequate wiring for future use of range and other appliances when lighting circuit is being installed.
(7) The advantages to the owner of the building.
(8) The advantages to the housewife.
(9) Advantages of the range in apartments.

The Idea Must be Sold

Electric ranges are sold—not bought. A purchase is never made until the prospect knows just where, when and how the device is going to fit into her life. Women do not know about electric ranges; therefore electric ranges are never bought "literally"; the salesman must sell the idea of electric cooking, not the range; perfect cooking service, not the price; what the range will do for her, not so much what it does for others—service is always with her—price is incidental. Make her imagine herself cooking more delicious, digestible and nourishing food with uniform results, at a minimum of time, work and cost and absolute safety.

Advise the complete utilization of the oven heat, suggest a pan of apples or various kinds of cookies can be placed in the oven after other food has been finished, and cooked with the stored heat. To a lesser degree, similar results can be had with the surface elements. Water may be heated for dishes after current is turned off with the heat remaining in the elements.

Surface elements are not harmed by water boiling over on them; heavy substances like molasses carbonize but can be removed when dry with a light non-metallic brush.

Cooking by electricity is a matter of education. When the inexperienced attain this information their enthusiasm will be passed on to others.

In some appliances criticisms of some sort may be made; not so with electric cookery. Simplicity, cleanliness, general economy, saving of work and food, perfect cooking, the new and better way appeals to the housewife who develops into the highest grade of advertising and does more to promote cookery among her lady friends than any other method. The expressions of a satisfied user should therefore be an advantage when her experience is an actual one, and her lady friends will not fail to be interested.

NOW, IF I BUY THE RANGE, WILL SHE LET ME JOIN THE LION-TAMER'S CLUB?

In selling Range, Customer Must be Given Free Information

Merchandising electric ranges might be said to be in its infancy. Considerable ability and knowledge with regard to all features of operating, installing and proper service are necessary. The contractor-dealer will remember the large percentage of prospects are laymen and know nothing about electric cooking or operating the range or requirements for same, and full information as to operation, use and cost in every detail should be given; also the various ways in which economy can be practised to get full value. In this respect, I refer to stored heat as one important feature and how to take advantage of it.

Many sales are lost because of failure on the part of the salesman to go into full details, with information, thereby allowing the prospect to leave with a doubt in her mind. Each feature should be explained fully—capacity of the element, also the various heats, high, medium and low, how operated and cost per hour of each, also that full heat is only needed until the food has come to the boiling point; then turn down to low heat which will carry on and save cost of operation 75%. This, it will be seen, is very important as low cost is a feature and bills can be reduced very much by care in this way.

It is also important that the contractor-dealer explain to the prospect that the more current used the cheaper it is

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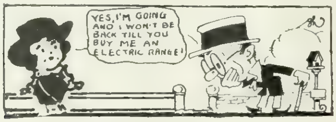
*Before the recent Contractor-Dealers' Convention.

[illegible] as it is safe to say not so many people know about it. In discussing cost of operating the range and water heaters, I have found people are at a loss to understand why the cost of operation is so low until they find the cooking rate here in the city and many other places is only one cent per kw.h. less 10% prompt payment. It is suggested the contractor-dealer make it a point to show the prospect how the cost is figured.

The cost of wiring and installing the range can advantageously be included with the price of the range. This will save the contractor-dealer the difficult task of selling the wiring separately which has been responsible in many cases of losing the sale. It also makes two sales instead of one and overcomes the impression that the cost of installation is high. In this case it will also show the prospect that the range service increases the value of the property, same as adding a sun parlor to the home or a garage.


YES, I'M GOING AND I WON'T BE BACK TILL YOU BUY ME AN ELECTRIC RANGE!

The Greatest Mistake in Range Selling

The greatest mistake in range merchandising today is selling below manufacturer's list price. It is a false policy and deliberately takes the legitimate profit. Moreover ranges have no standardized price and are not a seasonal proposition. Today electric ranges are sold every day of the year.

Every contractor-dealer should use an electric range in his own home, so that he can more fully and intelligently explain its advantages and operations, thereby fitting himself as a better salesman, gaining more confidence with the prospect.

He must know the general construction of the range and service needed and have a general knowledge of how to cook some of the simple popular foods, how to prepare the oven for baking, etc.

The contractor-dealer is just as important in his position as the central station, jobber and manufacturer, and belongs to the industry. He is entitled to live if he specializes in wiring and the retail selling of electric goods at a profit. He does not compete with the central station. He does not sell current and every transaction he makes shows on the profit side of the central station ledger, so he must be protected in the sale of ranges and other appliances.

Mr. Madill Takes over Electrical Department

Mr. F. G. Madill, has recently taken over the management of the electrical, household hardware, sporting goods, paints, kitchenware, silverware, china and cut glass departments of the R. H. Williams & Sons, Ltd., departmental store, of Regina and, since his appointment, the entire basement floor has been re-constructed—new stairway and lighting system, new stock fixtures and ceiling. Mr. Madill previously was engaged with the T. Eaton Co., Ltd., at Toronto, for a period of five years, as assistant manager of the china department, and for Porter & Company, Winnipeg, as one of their representatives in Western Ontario, Manitoba and Saskatchewan for four years; also with A. Rae & Co., Ltd., Ottawa, as buyer in the china, and hardware departments; the Right House, Hamilton, as assistant manager and the Robert Simpson Co., Ltd., Toronto.

Annual Dinner and Rally of Electric Service League of British Columbia

The entire electrical industry of Vancouver was represented at the annual dinner and rally of the Electrical Service League of British Columbia, held at the Hotel Vancouver, Tuesday Evening, November 21st, 1922.

A stunt program was arranged in which a representative of each branch of the electrical industry lauded to the skies the part his particular branch of the industry played in the activities of the Service League and then knocked the activities of some other branch of the industry—this was the signal for interruption on the part of the representative of the branch of the industry being "slated."

The speakers were Mr. Fred Little, manager of the Northern Electric Co. for the jobbers; Mr. W. W. Fraser for the electrical contractors; Mr. John R. Read, manager Canadian Westinghouse Co. for the manufacturers; Mr. Earl Jarvis for the dealers and Mr. Saville of the B. C. Electric Railway Co., Ltd. for the residence wiremen.

Mr. E. E. Walker of the B. C. Electric Ry. Co. as toastmaster tied in the remarks of the various factions with the conclusion that as every branch of the industry seemed satisfied with the efforts of the Service League their cooperative work must go forward with added impetus for the new year.

The financial report was made by Mr. H. Pim, manager of the Canadian General Electric Co., honorary-treasurer of the Service League. Mr. Rey E. Chatfield, secretary-manager of the Service League gave a report on the Electrical Home and Mr. Jas. Lightbody outlined the proposed activities of the League for the new year.

Real Spirit of Friendliness

The outstanding feature of the rally was the real spirit of friendliness and understanding apparent, which no doubt is in a measure due to the League work for the past year.

League Officers

Election of officers and members of the Advisory Council for the League for the fiscal year ending September 30th, 1923, took place at the meeting of the Advisory Council of the League which was held Thursday, November 23rd:

Hon. president—Mr. George Kidd, B. C. Electric Ry. Co.
Hon. vice-pres.—Mr. W. G. Murrin, B. C. Elec. Ry. Co.
Hon. sec.—Mr. Jas. Lightbody, B. C. Electric Ry. Co.
Hon. treas.—Mr. H. Pim, Canadian General Electric Co.
Chairman of the Advisory Council—Mr. E. E. Walker, B. C. Electric Ry. Co.

Advisory Council Members:—Mr. H. Pim, Canadian General Electric Co.; Mr. J. F. Little, Northern Electric Co.; Mr. J. R. Read, Canadian Westinghouse Co.; Mr. Ralph Graham, Mr. Earl Jarvis, Mr. P. F. Letts, Vancouver Association Electrical Contractor-Dealers.

It Costs More To Do Without Electrical Appliances!

When a housewife's time is figured out on a reasonable basis, the following facts are brought to light. Can you figure it out?

"Every woman who does without a washing machine, goes, annually, $22.77 in the hole. Those who do without an electric iron lose $49.40. Doing dishes by hand costs $164.22 a year. Cleaning by broom is a $21.87 household expense. For every year that the buying of an electric range is postponed, it costs the postponer $8.80. Sewing on the old-fashioned machines is a $126.16 extravagance."

Vancouver Stages First "Electric Home"

Activities of Electric Service League Give Definaite Stimulation to Retail Sales

Vancouver's first electrical home closed October 28, 1922, after a very successful exhibition lasting sixteen days. During this time 21,719 visitors passed through the home, or an average of 1,357 visitors daily. The record attendance for one day was 2,111, an average of 234 persons per hour.

To adequately advertise, manage and finance such an exhibition was quite a task for the industry. The chief difficulty to surmount was the question of finance, and this was overcome in a unique way. Through the co-operation of a firm of architects and a firm of plastering contractors the following scheme was worked out.

Financing

The selected building supply houses were approached with the proposition that the plastering contractors were financing the building of a model home, which would be exhibited as an Electrical Home by the Electrical Service League of British Columbia, and that tremendous publicity would accrue to the firms supplying material for the home.

Competitive bids were then called for by the architect for the materials needed and the successful bidders were visited by the secretary-manager of the Electrical Service League and a representative of the firm building the home, who **in every case succeeded in obtaining a material reduction** in the price for the material specified. The difference between the final price and the first competitive price of the successful bidder was paid to the Electrical Service League by the builder of the home—the local plastering contractors—as the nucleus of a publicity fund. In other words, the building supply houses, lumber mills, shingle mills, etc., bought publicity with their merchandise.

Many firms furnished better material than that specified because they saw the value of the publicity. However, the builder only paid the Electrical Service League and the supply house concerned, jointly, the competitive price for material specified.

Fifteen hundred dollars was raised in this way toward financing the advertising campaign.

The Electrical Service League contributed approximately $750.00 to the publicity fund and assumed the responsibility of managing the exhibition. The builder **agreed to pay the net cost** of the wiring installation as specified by the League. This scheme thus earned the interest and support of the entire building trade in the city.

Having thus overcome the chief obstacle, namely—finance, the League was ready to go through with the Home.

Publicity

The publicity campaign started three weeks in advance of the opening of the home, when a large billboard was erected at the intersection of three main driveways, one-half block from the home. This billboard showed a perspective sketch of the home itself, together with an announcement of the location of the home and the date of the opening.

On the site of the home another small billboard was erected giving the names of the co-operating non-electrical firms and the material each supplied.

From the time of erection of these two billboards until the home was completed the workmen were forced to work behind locked doors as people were constantly visiting the home in the hope of seeing it long before the date of the official opening.

The week previous to the opening the large advertisement shown below was run in all three newspapers of the city announcing the opening of the home. After the home opened the second advertisement was run in the newspapers and during the last week the third advertisement was used.

The route for automobiles was clearly worked on all possible roads of approach by signs attached to the trolley poles "To Electrical Home."

Several days prior to the opening date all street cars connecting directly with the line running to the home and cars on that line, carried fender banners:—

TAKE THIS CAR TO
THE ELECTRICAL HOME.
Opon October 11, 1922.
29th and Granville St.

Conductors on the street cars instead of calling the name of the street, announced at the proper corner "Electrical Home."

Some 400 street car advertising cards announcing the opening of the exhibition of the Electrical Home were used in the street cars. This space was donated by the B. C. Electric Railway Co., Ltd. but the League paid for the cards.

Similar window cards and auto banners were furnished all co-operating firms as well as all members of the electrical industry in the city.

The publicity campaign was quite complete and certainly produced results as far as attendance was concerned.

Every person leaving the home was presented with a booklet which contained a description of the electrical features of the home and a list of the co-operating firms.

Handling the Crowds

Having made every effort to assure a large attendance at the home it was necessary to handle the crowd. A House Committee of fourteen was chosen from the leaders in the industry, each of which had charge of the exhibition staff during at least one day while the Home was open.

The chairman of this committee as well as the chairman of the house furnishing committee and wiring committee reported direct to the manager of the Home who was the secretary-manager of the Service League.

The demonstrating staff was made up entirely of volunteer help recruited from the industry.

There were 440 positions to fill and 116 different men were recruited to do the demonstrating and give the talks.

Of this number 49 were contractor-dealers, 23 representatives of electrical manufacturers, 18 jobbers' representa-

[illegible] the central station, and 7 from allied interests.

Demonstrator Talks

The week before the home opened 150 copies of suggested talks for each demonstrator were prepared in pamphlet form and mailed to the demonstrators. The demonstrators did not learn these talks word for word but for the most part the talks were very closely followed.

A master sheet was prepared showing the dates and station each man was to fill and each individual demonstrator was notified in writing that on such and such a date he was to fill a certain station during a definite shift. Demonstrators served in two shifts of four and one-half hours each.

The day before the opening of the Home a private exhibition was held for the families of men in the industry. At this private exhibition and on the first shift of the opening day the House Committee men served as demonstrators so that every committee man was enabled to become thoroughly familiar with every detail of demonstrating the home.

Counting the Visitors

Perhaps the most important men on the demonstrating staff were the door man and the despatcher. The door man counted the visitors with a counting machine and saw that groups of from ten to fifteen only entered the home at a time. These groups of visitors went through the home as a group and were passed from room to room.

The talks in each room were so synchronized that when the despatcher pushed the button controlling an electric bell each group was ready to move on to the next room. The route through the home was arranged so that no two lines of traffic crossed; consequently the visitors were able to see every feature in the home without confusion.

On the opening day a reception to the executives of the various Women's Clubs was held and the formal opening of the home was made by the President of the Associated Women's Clubs of Vancouver.

Interesting the Architects

In addition to the two private exhibitions already described a private exhibition was held for members of the Architectural Institute of B. C. No attempt was made to have a full staff on duty for this exhibition but the architects spent several hours in the home and the men on duty merely answered questions.

Special invitations were mailed for all three private showings of the home and admission was by invitation.

Adequate wiring installation was the keynote of every talk, except the talk by the man receiving the visitors upon their entrance to the home. This demonstrator explained the purpose of the home and the manner in which the appliances were chosen.

As a means of creating a desire on the part of the public for better wiring, the exhibition was an unqualified success.

Sales have been Stimulated

Appliance sales have been stimulated and prospective builders are already calling upon the League for assistance in laying out wiring installations.

As a direct result of the home much residence wiring is getting away from the hands of the curbstone contractor and comes to the legitimate contractor-dealer and the convenience outlet idea is sold to many people.

Recently a man phoned the League office to this effect—"Why say, I have your Electrical Home beat seven ways,—you ought to see my new home—You only had 202 outlets in the Electrical Home and I have 342 in mine—You only had 43 convenience outlets in your Electrical Home and I have 65 in mine." His figures were correct and the secretary asked where he got the idea and he answered—"Why—at the Electrical Home of course."

Undoubtedly the Electrical Home has done much to promote appliance and better wiring installation sales, but it also did much to cement together with the various branches of the industry as we had curbstone contractor and legitimate contractor-dealer; jobber salesmen and central station representatives working side by side for a common cause.

Buy Electrical Goods Yourself

It is a particularly good suggestion that everyone employed in the electrical industry should strain a point to make their Christmas purchases entirely of electrical goods. It is urged that employers should point out to their employees that their purchases of electrical devices really increase the ability of employers of electrical labor to provide steady employment, and that it adds to the prosperity of the industry as a whole.

The idea, we believe, is well worth driving home. If we in the electrical industry believe in the value of electrical goods then we should ourselves demonstrate this fact when it comes to making purchases of Christmas presents. If every man in the industry will buy electric goods, the moral effect alone on the total number of sales made this Christmas might be really tremendous. Charity begins at home. Let us not overlook giving our own industry a boost ourselves at the same time that we are urging the public in general to do the same.

Trade Publications

The first annual report of the British Cast Iron Research Association has been received. The object of the Association is to promote co-operation among iron founders with a view to carrying out industrial and scientific investigation relative to the production, treatment, manufacture, and uses of cast Iron. The report describes a large number of researches that have been undertaken. The report is issued from Central Street, Birmingham, England.

"Electricity From the Wind" is the title of a booklet recently issued by the Glasgow Engineering Company, Limited, Pitt Street, Glasgow. The booklet describes various wind engines, towers and dynamo connections. The idea of directly coupling a windmill to a generator is somewhat novel in this country, but the idea would appear to have certain applications of real use.

In order to acquaint the industrial gear user with the advantage of Micarta Gears, the Westinghouse Electric & Manufacturing Company has issued a 20 page booklet, Folder 4506, entitled "Salient Facts on Silent Gears." The booklet describes the advantages of the use of Micarta gears and pinions and gives photographs and data describing some of their applications, tables of gear data, etc., enabling the gear user to judge whether or not they are applicable to his machinery.

Because of the unusual interest and activity of railroads in heavy traction electrification, the Wsetinghouse Electric & Manufacturing Company has reprinted an article on the "Advantages of Railroad Electrification" by Mr. R. J. O'Brien of its Heavy Traction Department that appeared recently in the technical press. The publication is known as reprint No. 128.

Contractors and Dealers of Toronto Hold Meeting for Discussion

Licensing, Co-operative Buying, Relations with Manufacturers and Jobbers subjects of much argument,—Committee appointed

A well-attended meeting of Toronto contractors and dealers was held in the Empress Hotel on December 1, City and suburbs were equally well represented. Mr. E. A. Drury acted as chairman and Mr. J. A. McKay as recording secretary.

The first subject discussed was the matter of licensing. Several speakers explained what this was and alluded to what had been accomplished in other cities. The fact that plumbers require licenses was mentioned. The distinction between city and provincial licensing was pointed out. No objections were raised to licensing, beyond the suggestion that those in the country might not be able to work in the city. A committee was appointed to look into the matter. This committee will deal mainly with the question of city licenses.

Another question brought up was "Co-operative Buying. The opinion was explained by one of the members that this was the best way of meeting present unfavorable conditions in the trade. He stated that jobbers gave no co-operation to contractor-dealers. In some cases their salesmen actually took orders away from the contractor-dealer. At the present time the manufacturer has a cast-iron organization; so has the jobber. Contractor-dealers are not by any means so strongly organized. Were the manufacturers and jobbers in favor of the provincial licensing bill? Recent advances in the tariff on electrical goods coming into Canada would indicate that the manufacturers and jobbers have some political influence. Why then do they not exert this to get a proper licensing bill?

There were all sorts of rumors floating around about price-fixing and so on. "Prices have advanced recently on many wiring items—Co-operative buying will help to eliminate this. Get together, pool a certain amount of money; everybody will come in if we can show how they can get goods cheaper."

A hot discussion followed. Several speakers contributed their experience of what had happened to co-operative buying in other lines of trade. It was pointed out that at the present time the contractor-dealer was up against unfair competition from jobbing houses. Some of the less reputable would sell to anybody at jobbing prices. A great trouble was the fact that general contractors could buy wiring supplies and then have jobs done by day labor. It was not uncommon to find jobbers selling fixtures, reflectors and so on direct to builders.

The discussion then veered around to the question of appliances. The complaint was made that there was not a big enough spread on these. Hardware lines were contrasted with electrical lines. It was pointed out that electrical appliances require intensive selling methods. One speaker said that he believed certain appliance manufacturers would be glad to sell direct to a co-operative buying association.

It was finally decided that the best thing was first to get everybody in line. Then go to the jobbers with the idea of getting them to co-operate. There was no desire to eliminate the jobber. What was wanted was to get him to co-operate to the extent of charging an established retail price to others than the trade. In the opinion of some speakers, this might be accomplished. If this failed they could go on in other ways. At the present time wholesale grocery jobbers were up against it. Examples of successful co-operative buying by drug and hardware stores were given.

It was finally decided to appoint a committee to approach the jobbers on the question of what co-operation could be expected from them.

Turning Stock 10 times per year

Mr. A. C. McCammon, recently leased space to the amount of 225 square feet on the main floor of one of Regina's leading department stores—the Regina Trading Company—for electrical merchandising, carrying Westinghouse ranges, Community washing machines, Northern electric vacuum cleaners, electric fixtures, tungsten lamps, flashlights and appliances of all descriptions—Hotpoint, Canadian Beauty, Superior and Majectic. Mr. McCammon was previously manager of the electrical and hardware departments of the R. H. Williams & Sons, Ltd., Departmental Store, Regina, Sask. He states that since opening here six weeks ago, business has more than realized his expectations. Stock has been turned over 1.2 times since opening.

New "Electric" Block

Contract for the new "electric block" has been let to Mr. Wm. M. Orr. The building plans call for a two storey structure 62 feet in depth. The ground floor will be occupied by the Chilliwack Electric Co., as a store, office and workshop. With the facilities the new premises will afford the Chilliwack Electric Company expect to be able to give the public a thoroughly efficient and prompt service.

If we who are engaged exclusively in the electrical game are to hold and extend the appliance business, we must all face the situation squarely and adopt attractive measures to gain an increased volume of sales.

Radio Amateur Clubs in France

Owing to governmental restrictions, the development of radio amateur clubs in France has been so retarded that up to date there have been few in existence outside of Paris. The Radio Club of France has recently established its first branch office at Marseille, and its local representative has opened offices at No. 44 Rue des Abeilles and in the grounds of the French National Colonial Exposition. The program of the club provides for lectures, exhibitions, and advice to amateur radio operators and to commercial operators as well, the idea being to foster the development of the radio art.

$750 Worth of Electric Appliances Offered for an Electric Slogan

Contractor-dealers of Winnipeg Stage a Competition That Has The Whole City Interested—Competent Judges Selected To Pass on the Slogans—Contestants Are Given Plenty of Time

Over seven hundred and fifty dollars worth of electric appliances any one of which will be a distinct addition to the home are being offered by the Winnipeg Electrical Contractor Dealers' association as prizes for the "Slogan" contest.

Great interest has been aroused in this competition, and as there are eight prizes these slogans will be judged according to merit, and the prizes given accordingly. The competition will remain open until December 23 and the following are the prizes offered:

1—Westinghouse electric range, installed in home	**$210.00**
2—Community electric washing machine	**144.00**
3—Northern Electric radio set	**125.00**
4—Hot Point electric table set	**90.00**
5—Universal electric vacuum cleaner	**70.00**
6—Moffat electric grate	**48.00**
7—Star electric heater, 1 to 3 k.w., and wiring	**50.00**
8—Electric air heater	**24.00**

Competent judges will be selected to pass on the slogans sent in. The slogan must be expressive of the objects of the association, and these objects are:

1—To further the developments of the electrical industry in Manitoba.

2—To combine safety, convenience and reliability in the application of electricity to homes and commercial institutions.

3—To maintain a high standard of business ideals amongst electrical dealers.

4—To create a high standard of workmanship in electrical installations.

5—To give to the public the benefit of their experience in the latest developments of the electrical industry.

6—To place their guarantee behind all the goods they sell and the work they do.

It is to be noted that anyone can send in as many slogans as they like. They must be sent in an envelope addressed to "Slogan Editor, Contractor Dealers' association, Builders' Exchange, 402 Notre Dame Investment Building, Winnipeg."

The prizes offered are very valuable ones and will be appreciated by anyone fortunate enough to satisfy the judges.

Radio Activities in Saskatchewan Province

Northern Electric Conference brings Radio fans together. Addresses and Demonstrations. Smallest regenerative set. Manager Daly master of Ceremonies.

Under the auspices of the Northern Electric Company of Regina, Sask., through their branch manager, Mr. J. A. Daly, formerly with the company at Toronto and Hamilton, a radio address and demonstration was given before the Engineering Institute, officers of the No. 12 Signal Corps, and radio enthusiasts of Regina and district, on November 27, 1922 by Mr. Hugh Campbell, radio sales engineer of the Northern Electric Co., Montreal.

The address and demonstration created so much interest among those present, that Mr. Campbell received an invitation to address the Rotarions of Regina on the same subject, but owing to previous arrangements in connection with the Northern Electric Co's. radio dealers' conference, it was impossible for him to fulfill the engagement, much to the disappointment of the Rotarions.

The radio sales conference of the Northern Electric Co., sales dealers of Saskatchewan was held in the company's offices in Regina, on November 27 and 28, at which about thirty dealers attended. They were given an address and demonstration by Mr. Hugh Campbell who dealt with the now famous peanut valve, audio and radio frequency receiving sets and loud speakers.

The dealers showed a great deal of interest in the company's two stage radio frequency set, and in the variety of loud speakers which the company have recently put on the market.

A Jolly Banquet, too—

At the conclusion of the conference, a banquet was held in the Kitchener Hotel, presided over by Mr. Daly and, after the banquet, short addresses were given by Mr. Garnett Perry, of the Sun Electric Co., Regina; Mr. Harry Burleson, of the Acme Electric Co., Moose Jaw; Mr. W. Robbins, of Watrous; Mr. A. Townsend, of Milestone, Sask., and several others.

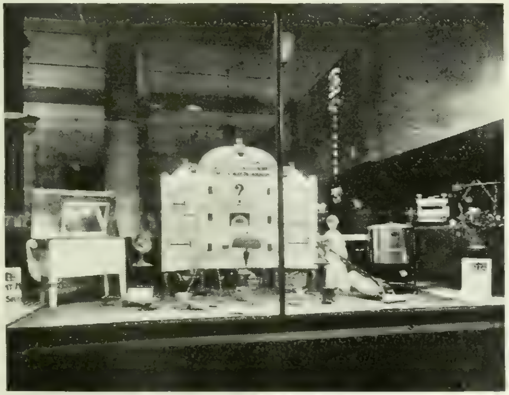
Mr. Daly referred to the interest shown by the dealers throughout the conference, and then remarked how fortunate they were to have Mr. Campbell with them; he felt that the sentiments of everyone present, were, that the address was very instructive.

It was also mentioned that the Regina branch of the Northern Electric Company were carrying large stocks of radio sets and parts, and they had recently received a large shipment of peanut valves, which were in great demand at the present time.

Smallest Regenerative Set

It is worthy of mention that Mr. A. Townsend, proprietor of the Milestone Light & Power Company of Milestone, Sask., and a Northern Electric dealer, who was present, had perfected one of the smallest regenerative radio receiving sets on the market. It consists of a walnut box, measuring 4½ by 5½ square inches, in which is installed the A and B battery, and one Northern Electric peanut valve. This marvelous small set, connected to a Northern Electric loud speaker picked up Los Angeles, 1,200 miles away, Kansas City 954 miles, and Davenport, U. S. A., 900 miles away.

Mr. Townsend has had a wide experience in this line, having been previously on the technical staff of the British, Thompson, Houston Co., of England.



Tieing in the dealer advertising with a general publicity campaign. Window display by the Light, Heat & Power Co., during the recent demonstration of a properly equipped Electric Home in the city of Montreal, P.Q.

Antennas and Their Relation to Radio Reception on Short Waves

Extracts From an Interesting Address Before the Recent Toronto Radio Convention by Dr. C. A. Culver, Chief Radio Engineer Canadian Independent Telephone Company

It may be set down as axiomatic that a vertical antenna is, other things being equal, the most efficient type of receiving system. Experience, both theoretical and practical, of radio investigators covering a period of many years, bears out this statement. There are, however, obvious practical reasons why a vertical antenna is not used for ordinary private reception. We are all also probably familiar with the fact that the next best aerial receiving system is the horizontal antenna, composed of one or more wires. The practical question arises in this connection concerning the most suitable form of such an antenna, having in mind both the strength of signals and the atmospheric disturbances.

Speaking generally it may be said that for the wavelengths used in broadcasting, a horizontal antenna consisting of two wires spaced not less than 5 feet apart and having a length of 100 to 150 feet with a height of the order of 35 feet will give very satisfactory results. Shorter antennas are, of course, in wide use with correspondingly lesser interception of energy. One factor should be borne in mind in this connection, namely, that the natural period of the antenna, should, in general be less than the wavelength which it is desired to receive. For receiving 360 to 400 meter waves, an antenna having a natural period of the order of 200 to 250 meters is a very satisfactory arrangement. Many people have the erroneous impression that several wires spaced quite closely together will intercept more energy than say two wires spaced as indicated above. The object in a multiplicity of wires is to add capacity to the antenna, and it is not generally realized that several wires spaced closely together, say of the order of 1 foot do not have very much greater capacity than two wires spaced five or six feet apart.

Buried Antenna Satisfactory

It is a fact that an antenna system buried in the ground will functionate quite satisfactorily, but in arranging such a subterranean system, it should be made very much longer than one placed above the earth, in order to abstract an equal amount of energy from the advancing wave front. The writer has received Trans-Atlantic telegraphic signals on a single wire several hundred feet in length, enclosed in a lead sheath and buried in the earth. The ratio of signal strength to X's is somewhat better than on one of the aerial type. Such subterranean antennas are very directive, and if used, the free end should be insulated at a point in a direction opposite to the station from which reception is to be had. In using the longer subterranean systems for short wavelength work, it is possible to receive the wave at a harmonic of the antenna system. Indeed such a procedure is possible when using unusually long aerial antenna systems. In fact it may be stated, as a general principle, that, as indicated above, a natural period antenna system should be less than the wavelength one uses to receive or several times the wavelength.

Parenthetically, one may remark at this point, that a tuned antenna system may be excited by a wavelength of double the value for which it is tuned. In fact, in such a case, we have what might be called a sub-harmonic or lower partial. The speaker has, at different times, been advised by radio experimenters that a station was radiating a strong first harmonic, when as a matter of fact repeated careful investigation by means of a wavemeter, disclosed the fact that no first or second harmonics existed. What was probably happening at the receiving station was that the antenna system was tuned to a wave of the order of 200 meters, and was being excited by a wavelength of approximately twice that value.

Interference From Broadcasting and Other Stations

Indeed the whole question of interference from broadcasting and other stations may properly be touched upon at this point. Not long since the speaker had occasion to be testing some commercial receiving apparatus when a local newspaper station was operating. We investigated to determine whether it is possible to tune out a local broadcasting station operating on 400 meters sufficiently to be able to receive the 360 meter broadcast. As a matter of fact, we found while leaving our secondary circuit tuned to 360 meters and manipulating only the primary condenser of the loosely coupled set, it was possible to completely shut out this station on 400 meters, and receive any or all of the American stations. I have recently had one of our engineers determine whether the 400 meter wave of CFCA interferes seriously with the 600 meter commercial wave. Our findings are to the effect that when using modern receiving equipment, there is no serious interference of this character.

It is true, of course, that when using single circuit tuners or certain receivers having a broadly tuned standby circuit, that interference probably will occur between both the 360 and the 400 meter wave, and the 600 meter commercial wave. However, when using an inductively coupled receiving system, there is no appreciable interference between the waves mentioned. This is shown by an audibility curve taken on a standard receiving set. In setting up this curve of audibility on the detector it was plotted against wavelength. An examination of the curve disclosed the fact that 360 meters station CFCA has an audibility of 2.5, at 400 meters, (its working wavelength) it has an audibility of 200 meters, at 475 meters it has an audibility of 7½, at 500 meters it has an audibility of approximately 1. These quantitative measurements clearly show that when properly designed receiving equipment is used, no interference need to be experienced from CFCA when working on commercial wavelengths. The writer would be glad to arrange to have any commercial company which is now experiencing interference from CFCA or CKCE supplied, without charge, with a receiving set, in order that they may be free from the alleged interference.

The Resonance Wave Coil

Continuing now our discussion of receiving antenna systems, it is desired to call attention to the so-called resonance wave coil brougt out by the officers of the American Army Signal Corps.

The theory of the resonant wave coil has been thoroughly discussed from an analytical point of view by Flemming and others. It has been well known for many years that standard waves may be set up on a closely wound helix.

These standard waves manifesting loops and nodes of potential, if we make the inductance and distributed capacity of such a coil of the proper value, so that its fundamental period will be the frequency which we desire to receive, we will have a potential loop at one end of the coil and a loop at the other end. This point of maximum potential may be connected to the grid of an audion, (which, of course, is the potential device), and signals may be received thereby. Major Mauborgne and Captain Hill of the American Army have done considerable work with such an electrical organization. Our Mr. Logwood has developed a receiving circuit particularly adapted for use in connection with the wave coil. Such a circuit in conjunction with a resonant coil has been in use for some time by a local newspaper on its portable receiving station. In efficiency the wave coil is comparable with a loop and for certain uses possesses the advantage that when in a vertical position, it is non-directional.

How to Avoid Radio Interference

In order to assist radio broadcasting there are two wave lengths on which broadcasting may be conducted. These wave lengths are 360 meters, the one in general use up to this time, and 400 meters, just recently alloted. While these wave lengths are 40 meters apart, undoubtedly there will be considerable confusion on the part of those owning radio receivers who are located very near a broadcasting station.

For the purpose of assisting those who are located so that a 360-meter, and a 400-meter station are picked up by their receivers simultaneously, number of methods will be described, which, if applied, should greatly assist those desiring to get either one of the two waves without interference. There is one case, however, which will be very difficult to assist; that is, where the receiver is exceptionally near to a broadcasting station—say within a few thousand yards.

Tuning More Sharply

The assignment of two wave lengths so close together will have the effect of stimulating construction of radio apparatus which will be capable of tuning more sharply, and it is the case of "necessity being the mother of invention." Therefore while there may be some inconvenience at the time, this should be overlooked in order to help the radio game by creating a condition which will stimulate the construction of better apparatus, and which will permit the assignment of more wave lengths, ultimately creating a better situation in the other.

One of the greatest faults that has been found in connection with the installation of radio receiving apparatus is that it is believed that the more wire and the larger the antenna, the more will be received. An exceptionally large antenna makes it more difficult to tune sharply, and for this reason it is advocated that a very short single wire antenna, approximately 75 feet long measuring from the apparatus to the far end, be used. This single wire antenna should be stretched away from all metallic objects and run straight and clear of all obstructions.

Another fault in the installation if receiving apparatus can be eliminated by not running the antenna or lead-in over metal roofs, along water spouts or drains, or parallel to telephone and power wires.

Value of Short, Low Antenna

Frank Conrad, assistant chief engineer of the Westinghouse Electric & Manufacturing Company, has made measurements and drawn resonance curves which show that a short low antenna tunes more sharply than large and long antenna. This holds true both for coupled and single circuit tuners.

Another method to pursue in overcoming interference, especially where vacuum tube receivers are used and where the receiver is located close to a broadcasting station, is to make use of the well-known directional properties of the loop antenna. A very simple loop can be constructed by winding a half dozen turns of wire spaced about one inch apart, on a framework, which can be rotated. It will then be easy to tune aut a station which has a difference of 40 meters in wave length, especially so as a loop antenna forms a closed circuit which can be more smartly tuner than an open atenna. The two ends of the loop should be connected across the antenna, the ground terminals of the receiver, and no other ground or antenna used.

Where Amateur Has Transmitting Apparatus

Those who are located a greater distance from a broadcasting station can, without any difficulty, tune in either one of the wave lengths mentioned. They should, however, bear in mind that a single wire antenna, not too long, and kept free from obstructions, and not running near grounded metallic objects, will tune sharper. Where the amateur has a transmitting apparatus it is of course desirable to have a fairly large antenna, with more than one wire, and if such is the case he should use a separate wire for receiving.

The ideal condition will be when stations can operate independently on either of two wave lengths without interfering with each other, and because the receiving apparatus is an important factor these suggestions are given in order that owners of receiving apparatus may have the necessary information to increase the efficiency of their apparatus.

Lincoln Meter Company to be Found in Future at 72 Stafford Street

On November 20th, the Lincoln Meter Company moved from 243 College Street to 72 Stafford Street, Toronto, Ontario. This company has been at the old address for four years.

At this address the Lincoln demand meter was first put into quantity production, due to the satisfactory results obtained from one hundred meters which had been built up two years previously and tested out under all sorts of conditions.

It was here that the Lincoln graphic meter was developed. The Lincoln split core transformer and demand ammeter were also worked out here, and the V. A. D. transformer which made the measurement of volt ampere economically possible; lastly, the Lincoln-Sangamo unit.

"We look back with no little sentiment to that place" says Mr. S. L. B. Lines, vice-president of the concern. "We feel as though that building saw a very considerable advance in rate making. We are proud there is such a place in Canada."

At the new address the Lincoln Meter Company Limited, will have considerably more space. Acceptance and recognition of the Lincoln principle has called for increased production facilities.

Electrification Postponed

The directors of the T. & N. O. Railway System, with the approval of Premier Drury, have decided against the immediate electrification of their railway. The estimated expenditure was in the neighborhood of 11,000,000 dollars and while the advantages were evident, it was considered that the revenue would not at present justify so great an expenditure. The Ontario Government has decided to build the remaining 100 mills of railroad to connect with a port on James Bay.

Have Established Toronto Office

The Canadian Fitzgerald Manufacturing Company, manufacturers of Star-rite electrical appliances announce that they have now established a sales and service branch at 95 King Street East, Toronto. The various appliances manufactured by this company include vibrators, violet-ray sets, toasters, reflectors, heaters, fans, heating pads, sewing machines and general utility motor and waffle irons. The office is in charge of Mr. J. A. Simmons.

Receptacles Without Rubber Rings

The Duncan Electrical Company, Ltd., of Montreal, have now ready for delivery two new receptacles, number 60020 and 50717. These are manufactured without rubber rings, being specially designed for use with nitrogen lamps, where the absence of rings to melt or break will be realized as an important consideration. These receptacles accommodate all shade holders and are 660 watt capacity, 250 volt.

Nice Order From Australia

The Canadian Independent Telephone Company recently received an order for 8,000 telephones from the government of Australia. Two shipments of this order have already been made. This is another evidence that Canadian manufactured products in the electrical field are well able to compete with those manufactured in other parts of the world.

An Attractive Folder

The Wagner Electric Corporation, St. Louis Mo., are distributing an attractive folder entitled "40 degree Motors and 'Blueblood' Transformers." The illustration shows transformers in a great variety of sizes, and explains that the high tension winding is tested for 10,000 volts and the low voltage windings for 5,000 volts. Transformers built for higher voltage are given correspondingly more severe tests.

Square D in Larger Offices

The Square D Company, manufacturers of electrical safety devices, whose Toronto office up to the present has been at 508 Lumsden Building, are moving to offices at 104 Richmond Street West, Toronto. The increasing volume of business in this district, which is in charge of Mr. C. H. Kneeling as district sales manager, has necessitated larger quarters.

The Wright Electrical Co.

The Wright Electrical Co. Ltd., 1715 St. James Street, Montreal, commenced manufacturing marine electric fittings, floor boxes, switch plates and canopies in November. The company is chartered for $20,000. Mr. P.M. Wright of The Northern Electric Co. Ltd., in the marine dept, is manager of the company.

Pole Yard at Charney

J. J. Seguin, telephone engineer, Quebec, advises that he is opening up a distribution pole yard at Charney, P. Q., in order to be able to give quick delivery of poles. Charney is located only a few miles out from the city of Quebec on the south shore of the St. Lawrence and is a divisional railway point where eight railroad lines converge.

"Cope" Bending Tool

T. J. Cope, Philadelphia, Pa., is placing on the Canadian market a tool for bending and forming cable in manholes, vaults or other cable installations. The tool will bend all sizes of cable from 500,000 c.m. to 2,000,000 c.m. and weighs only 12 lbs.

Rubber Insulated Wire

The Standard Underground Cable Co., of Canada, Ltd., are distributing a booklet describing their rubber insulated wire. The booklet is nicely illustrated and contains much interesting information.

"Red Devil" Tools

Smith and Hemenway Co., Inc., Irvington, N. J., are distributing an illustrated pamphlet entitled "Red Devil Automobile and Electrical Tools."

New Retail Store

Mr. Wallace S. Chugg, who has been in the electrical contracting business for some time, has just opened a store at 761 Bank Street, Ottawa, Ont., for the retailing of electrical fixtures, lamps and other equipment.

Isolated Plants in the West

As indicating the extent to which small lighting plants are being installed in Western Canada, we have information from the Canadian Fairbanks-Morse Company, Ltd., that the following sales have recently been made from their Saskatoon office. The engines in every case are their type "Y" Semi-Diesel.

Watrous:—One 100 h.p. engine direct connected to a 75 kv.a. 2,300 volt a.c. alternator, including switchboard and necessary instruments.

Craik:—one 25 h.p. engine belted to a 20 kv.a. 2,300 volt a.c. alternator, including switchboard and necessary instruments.

Bruno:—one 15 h.p. engine direct connected to a 9 kw. 110 volt a.c. generator; and one 10 h.p. engine direct connected to a 6 kw. generator including necessary switchboard.

Duck Lake:—one 15 h.p. engine belted to a 10 kw. d.c. generator with switchboard.

Lestock:—one 15 h.p. engine, belted to a 10 kw. d.c. generator and switchboard.

Young:—one 25 h.p. engine to replace the steam engine that was used last year.

French Railway Contract

An order covering the complete control equipment for 120 electric locomotives, now under construction, has been received by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., from the Paris-Orleans Railway of France as part of an electrification contract amounting to approximately $8,000,000,00. The Paris-Orleans Railway, which is one of the largest systems in France operating over 5,000 route miles of track, is electrifying 125 miles of its main line between Paris and Vierzon. This is the first of an extensive program laid out for the electrification of its lines.

A. A. Dobson Opens Store

A. A. Dobson of Cannington, Ont., who was once owner of the electric light plant of this town, before hydro came upon the scene, and who is well known as an all round electrical man, with many years experience as an electrical contractor, has recently opened a store dealing in electrical fixtures.

Ward Leonard Electric Co.

The Ward Leonard Electric Company announce the appointment of Mr. Willis D. Bishop, of Montreal, Quebec, as selling representative in the Province of Quebec. He has been closely identified with the design, application and sale of control apparatus and switchboards since 1904, and is therefore qualified to represent this line of electrical control apparatus.

W. D'Arcy Ryan a Nova Scotian

W. D'Arcy Ryan, of the General Electric Company, of Schenectady, New York, accompanied by Mrs. Ryan and their two children, was in Halifax recently, enroute to Kentville, on a visit to his father, Major Ryan of that town. Mr. Ryan received his early education at Wolfville and Halifax.

S. Wilkins Leaves Winnipeg Electric Railway Co.

Mr. Wilkins, who for some time has had charge of the track construction and rehabilitation work, as well as the construction and maintenance of all buildings of the Winnipeg Electric Railway Company, has resigned his position. The members of the track department presented him with a travelling bag, and a gold wrist watch for Mrs. Wilkins. while the department heads of the company together with Mr. A. W. McLimont presented him with a white gold watch. Mr. Wilkins will make his future home at Vancouver. No successor has yet been appointed.

Radio Insurance

Radio insurance is now being offered by various insurance companies. Blanket floater, radiophone policies against fire, lightning, burglary, theft and transportation accidents may be bought.

Trade Publications

The American Engineering Company of Philadelphia, represented in Canada by the Taylor Stoker Company Ltd., Montreal and Toronto, have issued a beautifully illustrated book containing pictures and descriptions of central station plants using Taylor Stokers. The illustrations include many of the largest steam plants on this continent, among them being the Montreal Light Heat and Power Co., and the Dominion Power and Transmission Company.

Ideas on the maintenance of equipment and proper application of transportation methods, are offered in two attractive publications issued by the Westinghouse Electric & Manufacturing Company. The first book—Electric Railway Equipment—Helpful Hints on its maintenance,—S.P. 1656, contains 112 pages. It gives the electric railway operator or the man directly in charge of maintenance a ready reference on maintenance practice. The second book, S.P. 1655, is a 20 page publication entitled "Electric Railway Transportation." The Light Weight Double Truck Car, the Safety Car and the Trolley Bus are the three leading topics discussed with pictures portraying the actual operation and installation of each type.

"Wave Transmission" is the title of a booklet recently received from Walter Haddon, 132 Salisbury Square, Fleet St., London, E. C. 4. It describes what is claimed as a new method of transmitting power. A description given in the booklet reads as follows—

"Taking the simplest form of Wave Transmission, imagine two cylinders fitted with plungers, the cylinders on the underside of the plungers being connected together by a long pipe completely filled with water. If one of the plungers is moved rapidly up and down it will set up at each downward stroke waves of compressed water, which. travelling along the pipe at the speed of sound (about 4,800 feet per second) will exert their energy on the plunger at the far end, and if this be loaded, a simple reciprocating motion will be produced in exact synchronism with the reciprocations of the first plunger."

The booklet describes various industrial applications that have used this principle. Rock drilling is featured, photos of such an installation being printed in the booklet.

"Far East" transmission lines are up-to-date, judging from the accompanying photograph of the Tone River Crossing suspension towers, Inawashiro H.E.P.Co., China. The photograph was sent us by Mr. E. V. Paniell of the British Aluminium Co.

The Rheostatic Type of Voltage Regulator

The rheostatic type of a.c. generator voltage regulator differs fundamentally from the vibrating type often called the "Tirrill" regulator, in that the new regulator maintains a constant a.c. voltage by means of the generator field rheostat, keeping the excitation voltage at a constant value, whereas in the vibrating regulator, the exciter voltage is varied in order to give the proper excitation current to the generator for a given load condition.

When a station is on hand operation, the field rheostat of the generator is usually manipulated to keep a constant alternating current voltage, while the exciter voltage is maintained at a constant value, or a storage battery may be used either directly—which is rare—or floating across the exciter busses as an emergency reserve source for that station.

This type of regulator supplements the vibrating type of regulator for such applications as are not best adapted to the use of the vibrating regulator. The rheostatic type of regulator is particularly applicable to installations where the time constant (or rate of response to change in voltage on the field of a generator) is slow, where exciters are of large capacity and slow speed, thus having heavy field currents beyond the capacity of the vibrating regulator contacts, or for synchronous condenser applications, where the excitation voltage across the field of the condenser must be lowered to a value below the residual voltage of the exciter, as is very often the case.

The rheostatic type of generator voltage regulator consists of 3 portions:

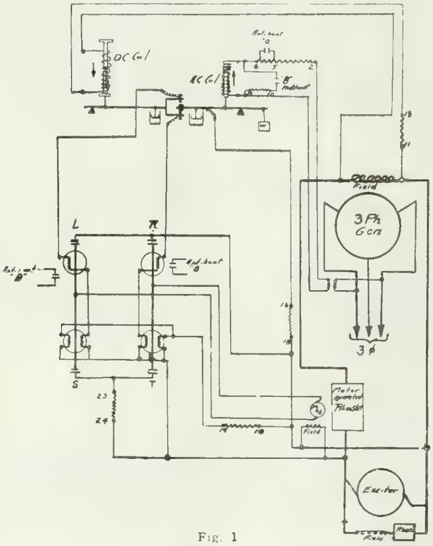


Fig. 1

(1) A control element.

(2) A pair of reversing contactor switches actuated from the main contacts of the control element. The reversing switches are for operating the rheostat motors in one direction or the other.

(3) A special generator field rheostat operating at a high rate of speed.

The control element consists essentially of a set of contacts jointly actuated by an alternating current and a direct current coil. These contacts control the direction of rotation of the rheostat motor through two reversing contactor switches. The a.c. coil is connected to the generator lead through the use of a suitable potential transformer. The d.c. coil is connected across the terminals of the generator field.

The regulator is either put in or out of service by means of a single drum control switch. When it is desired to place in service or remove the regulator from service, the turning of this one switch places the machine either on hand control or under the control of the regulator.

Fig. 1 shows a simplified diagram of this regulator.

The regulator operator as follows: Assume that a slight over-voltage exists on the generator due to a sudden drop of a portion of the load. This will cause the control levers to become out of balance, and close the upper contacts. This closure energizes the upper coil and de-energizes the lower coil of the reversing switch marked "LS" causing contact "S" to open, and contacts "L" and "b" to close. Contact "L" closes the circuit through the motor armature which in turn, starts cutting in resistance of the generator rheostat into the field circuit. At the same moment, contact "b" shunts a small amount of current from the alternating current coil on the control element, and in effect, recalibrates it for a slightly higher voltage. This causes the core to drop opening the main contact which in turn de-energizes the coil in the upper and lower portion of the reversing switch "LS" and this switch consequently opens its main contact "L" and auxiliary contact "b" and closes the lower main contact "S". Since contact "T" of the other reversing switch is in the closed position, the armature of the motor is now short circuited, causing it to stop quickly by the dynamic braking. This causes an intermittent movement of the rheostat arm generally known as "inching," and effectively prevents hunting when the alternating current voltage is very nearly correct. In a like manner, if the a.c. voltage is too low, the main control element closes its lower contacts due to the core dropping in the a.c. coil and actuates the reversing switch "RT" closing contacts "R" and "A" which in turn, reverse the direction of rotation of the rheostat arm, increasing the excitation and bringing the voltage back to normal. Due to an anti-hunting contact "a" which in this case cuts out a portion of the series resister of the main a.c. coil of the control element, the "inching" process is also obtained.

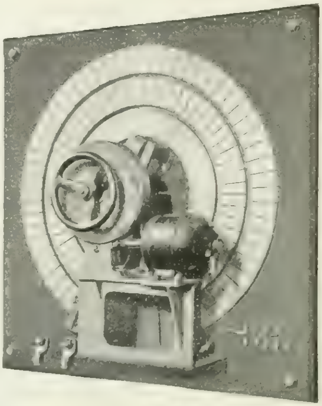


Fig. 2

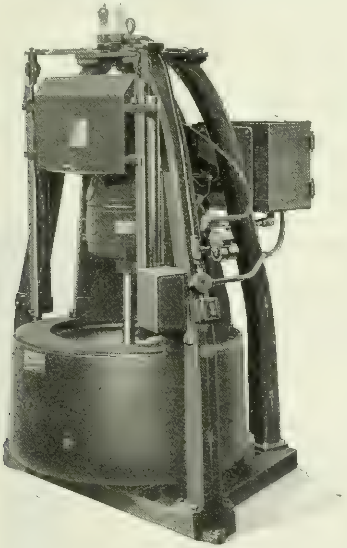
The Latest Developments in Electrical Equipment

Thumb Switch Portable Lamp Guard

The McGill Manufacturing Company, Valparaiso, Ind., are marketing a new lamp guard of novel construction. The guard carries a convenient thumb switch, so that it may be carried about and operated with one hand. It is claimed by the manufacturers to be particularly adapted for use in garages and the basements of private homes. A 25 to 40 watt lamp may be used.

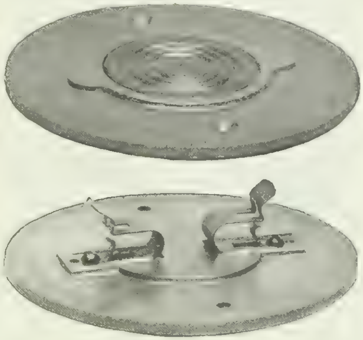
Automatic Extractor

The American Laundry Machinery Company, Cincinnati, Ohio, are manufacturing a clothes extractor for commercial laundries, which has several interesting features. A development which they mention particularly is the timing device by means of which it is possible to pre-determine the time of extracting. Another device is the safety cover which is raised automatically as soon as the basket has ceased revolving and which cannot be raised while the basket is in motion. It is claimed by the manufacturers that the timing device saves much time and labor by making it possible for the extractor man to set his machine for 5, 10 or 15 minutes and then work at some other duty. At the end of that time the machine will stop and the safety cover raised automatically, thus signifying to him that it is time to come back and unload.



Derby Fire Signal

The American Fire Prevention Bureau, Inc., 1 Madison Ave., New York, N. Y., are marketing the Derby Fire Signal, a device designed to give early warning of fire. It it claimed to be very simple in construction, having no moving parts, requires no adjustment and not subject to derangement or false alarms. It is composed of such materials as phosphor bronze, bakelite dilecto, varnished cambric and standard automatic sprinkler solder. The terminals are Fahnestock clips. It is claimed to be sensitive, owing to the form in which the solder is made and the heat conductivity of the bronze case. In a standard sprinkler test oven it is said to operate in one-fourth the time required to open an approved automatic sprinkler. The sentinel gives visual indication when it has operated, in the form of a small bulb of solder which appears in the centre of the thermostat. These thermostats are preferably wired on a closed circuit system, each floor being a unit. Any derangement of the circuit will give a local or central station trouble alarm. Upon the operation of a thermostat, resistance is automatically cut out of the circuit, thereby causing the operation of fire gongs and transmitters. It is made for attaching to open wiring and also for use in connection with concealed work.

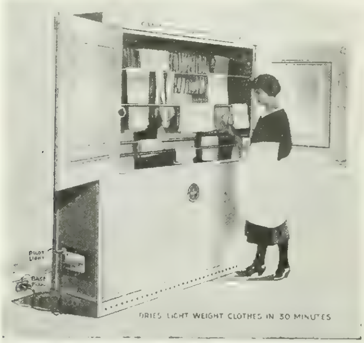


Compartment Battery Box

The Rub-Tex Products, Inc., Indianapolis, Ind., are marketing a new type of battery box for "A" batteries. The device is shown in the accompanying illustration. It is made in three sizes for 6-volt batteries of 7, 9 and 11 volt capacity. It is made conveniently portable by means of a loaded bail handle with rubber grip. This box is claimed to eliminate any trouble from leaky storage batteries and consequent worry to the radio fan.

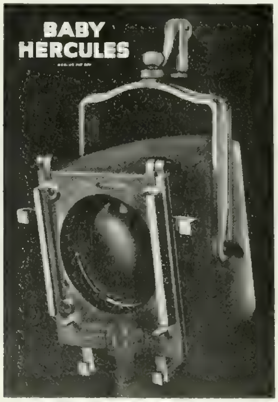
Electric Clothes Dryer

The Canton Clothes Ddyer Co., Canton Ohio, are manufacturing an electric heated clothes drying macihne. This device is so constructed that the heating and ventilating units generate ozone, valuable for its bleaching and sterilizing qualities. It is claimed that it is the only clothes dryer made with heater entirely enclosed within a radiator, and that any danger of shock to the user is entirely eliminated. Connections can be made to any outlet or socket as no special wiring is required. In addition to the heating element for the dryer, the manufacturers furnish one baseboard or wall recptacle, together with an extension cord of two strands of number 10 wire, each strand six feet long, with plug at either end. The extension cord can be disconnected at either the dryer or baseboard as the user may choose.



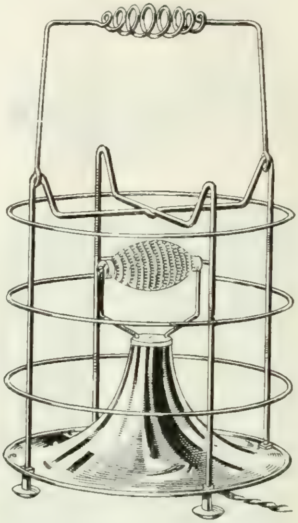
Spotlight for Window Lighting

To meet demands for window lighting of a flexible nature the Display Stage Lighting Company, Inc. of 314 West 44th Street, New York City have put in new form their Baby Hercules spotlight. It enables concentration or flooding of light of any color on merchandise. The housing is entirely of cast aluminum well ventilated around lens, sides and back, and fitted with a spherical reflector, French condensing lens and color screens. The lamp used is a 250 watt G-30 Mazda concentrated filament which unhoused has 431 horizontal candle-power, while in this equipment the beam candle-power is 2,000, from tests by the Electrical Testing Laboratories of New York City.

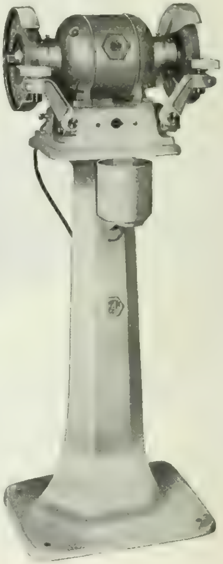


Reflecting Electric Radiator

The Electric Heating & Mfg. Co., Seattle, U. S. A., are putting on the market a new type of electric radiator. This product is known as the Circo-Flector, and it is claimed to throw the heat in all directions with no concentration in any one spot. The device is operated from a lamp socket (660 watts) and is 15 ins. high. It is said to be capable of doing small cooking operations on the top. It is furnished in a mailing carton, with 10 feet of asbestos cord and a two-piece separable plug.



Electric Grinder



An 8 in. electric grinder with a motor of ½ h.p. capacity is being placed on the market by the Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md. In order that the device may be used in places where either direct or alternating current is available, motors of a c. or d.c. type are provided as required. The grinder wheels have a diameter of 8 in. and a ¾ in. face. A toggle switch located in the base of the machine controls the operation of the motor. The speed of the motor and grinding wheels is 3,600 r.p.m. and without pedestal the net weight of the machine is 75 lbs.

Current News and Notes

Bolton, Ont.

Mr. W. H. Maw, a well-known electrical contractor and hydro superintendent of Bolton, Ont., has recently opened a very nice store, dealing in electric fixtures and appliances. This store is very attractive, consisting of two windows, one on either side of entrance to show room, a stock room in rear and an office situated at one side of the show room. This store when lighted by night, is very attractive indeed for a town of this size. The new store is known as the Bolton Electrical Supply Store.

Gore Bay, Ont.

Mr. Hutchinson, Government Hydro engineer, recently made an inspection of the Kagawong Falls with a view to estimating the power that may be available for supplying light and motor power for industries on Manitoulin Island and vicinity.

Kitchener, Ont.

The management of the Waterloo--Wellington Railway has applied to the city for a 25 year franchise. The question has been turned over to the Railway committee of the City Council, which will have a conference with the Light Commission.

Kingston, Ont.

The fire which broke out recently destroyed the feed mill and electric light plant at Tamworth, Ont., owned by Mr. A. B. Carscallen, doing damage at $12,000. As a result of the fire the town of Tamworth will be without lights till the plant can be rebuilt.

London, Ont.

The defeat recently of the by-law authorizing the taking over the London Street Railway does not mean that the idea of a municipal railway will not ultimately be adopted here. The possible expense of lengthy arbitration, the meagre details of the by-law given to the people, and the fact that the company's franchise does not expire till 1925, all worked against the by-law. It is possible that the road may be purchased within the year by agreement.

Mimico, Ont.

As a result of a fire, which broke out recently, the temporary building, housing the York sub-station of the Hydro-electric on Church Street, was completely destroyed and some of the machinery was badly damaged. The transformers were only slightly damaged.

Moose Jaw, Sask.

The Livingston Electric Company, electrical engineers and contractors, Moose Jaw, Sask., have recently moved from 161 High Street West, to much more commodious premises, at 16 fairfoot Street, West, Moose Jaw, where they will be able to carry a much larger stock of electrical goods on display.

The Electric Shop, Mr. J. Ecclestone, proprietor, wiring contractors and general supplies, was recently opened to carry on contracting and will also stock a full supply of electrical merchandise.

The Moose Jaw Gas and Electric Company have ceased to do business.

Ottawa, Ont.

The Ottawa Electric Railway Company has recently offered to sell out to the city its entire system, with all property and assets, including water lots, for $4,500,000, or is willing to accept a price fixed by arbitration.

Quebec, P. Q.

First reading was given in the Legislature Assembly an November 16 to the bill amending the charter of the Montreal Public Service Corporation, and changing its name to that of "The Quebec New England Hydro-electric Corporation."

Toronto, Ont.

Approval by order-in-council was recently given for the sale of the Toronto Suburban Railway to the Hyrdo-electric Power Commission of Ontario. The terms and conditions of the transfer are left to the management of the road.

Gross earnings of the Northern Canada Power Co., for the first nine months of the year stand at $538,959 as against $370,453 a year ago; net earnings $479,900 against $312,679, an increase of approximately 63.5%.

Mr. P. W. Ellis, chairman of the local Hydro-electric Power Commission, recently stated that the commission was of the opinion that a conservative estimate of the increase in power consumption in Toronto alone was 10 per cent. per annum. On this basis, in 1929 the Toronto Hydro would require 235,000 horsepower for sale to users, exclusive of the power required to operate the street railway. In view of this the commission considered there was immediate need of laying plans for increased generating capacity at Chippawa.

The Patterson Electric Co., electrical contractors, have moved their offices to the Northern Life Bldg., 615 Yonge St.

Windsor, Ont.

Mr. James E. Banwell has been re-elected Hydro commissioner over Mr. A. Moore.

J. S. Torry, a Toronto electrical contractor, has recently opened a store at 407 Roncesvalles Ave., Toronto, and is dealing in Electrical Fixtures and appliances and is doing contracting as well.

Wiring Contracts Awarded

Aylmer East, Que.

F. Woolsey, Aylmer East, $4,000 res., St. Thomas & Court Sts.

Cap De La Madeleine, Que.

P. E. Lacroix, Point St. Maurice, $5,000 res., Notre Dame Street.

Chambly, Que.

C. E. McGregor, 55 Mercille St., St. Lambert, $12,000 clubhouse, Bourgogne St.

Dorval, Que.

E. Miller, 141 Notre Dame Street, Lachine, $18,000 res.

Lachine, Que.

Phillip Lahee & Co., 20 St. Nicholas St., $300,000 school.

Verdun, Que.

E. Robillard, 225 Hamilton St., $75,000 flats, Lasalle Rd.

Westmount, Que.

S. M. B. Electric Co., 485 Beaumont St., $25,000 pr. semi-detached res., The Blvd.

Windsor, Ont.

Chas. Usher, 9 Aylmer Ave., $4,500 res., Pelissier St.

Levis, Que.

Nap. Lepage, Bienville, Que., $18,000 hotel, Commercial St.

Hamilton, Ont.

Jno. Donaldson, 184 Charlton St. W., $12,000 factory.

Maxville, Ont.

R. J. Desjardin, residence, Mechanic St.

Mimico, Ont.

H. J. G. Ferguson, 69 Boon Ave., Toronto, $30,000 church.

Montmagny, Que.

La Cie Electrique De Montmagny, $200,000 altering church, contract price $2,000.

Montreal, Que.

R. Chamberlain, 16 Garnier St., three flats, Bordeaux St.; $9,000 res., 898 Bordeaux St.

P. Houle, Cote St. Paul, four res., $60,000 Victoria St.

F. Neyrinck, 802 De Gaspe St., $20,500 alt., bldg., 227 Peel St.

M. Pelletier, Christope Colomb St., $8,000 extn. bldg., Mt. Royal & Chambord; also on bank, Vinet & Notre Dame.

Phillip Lahee & Co., 20 St. Nicholas St., $125,000 add. bldg., Craig & Place D'Armes Hill.

Sayer Electric Co., 87 Bleury St., $20,000 store, St Hubert.

Ottawa, Ont.

J. N. Cherry, 50 Victoria St., $8,000 res., Grove Ave.; $5,000 res., Sunnyside Ave.; $10,000 store & garage, Beechwood Ave.; $8,000 store & apt., Sunnyside Ave.

Art. Davis, LeBreton St., $3,000 res., Melrose Ave.; $5,000 res., Glen Ave.

J. A. Davis, LeBreton, $5,000 res., 2nd Ave.

J. Ellacott, Bank & Strathcona, $8,000 res., Lakeside Ave.; $5,000 res., Wendover Ave.; $5,000 res Harvard St.

Mr. Harding, $6,400 alt. bldg., O'Connor & McLeod Sts.

E. Headly, 645 Echo Drive, $5,500 res., Grove Ave.; $5,600 res., Ossington Ave.

Mr. Hoffman, Westboro, $5,500 res., Powell Ave.

A. E. Lennox, 195-5th Ave., $5,000 res., 5th Ave.

E. G. Tressider, 58-5th Ave., $12,000 hall Gloucester St.

Outremont, Que.

Sayer Electric Co., 87 Bleury St., $15,000 cottage, Nelson St.

Owen Sound, Ont.

Mm. McMeekins, 5 Ave. E., $4,000 res., 4th. St. E.; $6,000 res., 4th St. W.

Port Credit, Ont.

A. McPherson, $33,000 school.

St. Ambroise, Que.

Gilbert & Frere, Chicoutimi, $89,000 church & sacristy, Lac St. Jean.

St. Catharines, Ont.

I. Beatty, 10 Facer St., $6,000 res., Highland Ave.

F. Crawford, Ottawa & Fitzgerald St., $6,000 res., 25 Brock St.

St. Johns, Que.

A. Beaudry & Fils, $25,000 res.

St. John, N. B.

Driscoll & Machie, 9 King Square, $14,000 remod., hospital, Waterloo St.

St. Tite, Que.

Jas Gignac, Shawinigan Falls, $37,000 college, Champlain.

Smith Falls, Ont.

John M. Fader, $4,200 res., George St.

Three Rivers, Que.

Paul E. Allard, $8,000 tenements, St. Ursule Street.

Eug. Bedard, $6,000 three tenements, St. Ursule St.; $12,000 four t'ments., St. Cecile St.

Emile Bettez, $7,500 three t'ments. La. Verendry.

Henri Guilbert, 327 Laviolette St., $7,000 two t'ments., St. Paul St.; $6,000 three t'ments, st Ursule St.; $5,000 two t'ments, St. Ursule St.; $5,000 two t'ments, 116 St. Ursule St.; $5,000 two t'ments, St. Ursule St.; $8,000 t'ments, St. Angele; $5,000 two t'ments, St. Angele St.; $5,000 two t'ments, St. Ursule St.; $5,000 two t'ments, St. Ursule St.; $5,000 two t'ments St. Angele St.

Eug. Ouelette, 225 Chamflour St., $10,000 two t'ments St. Denis St.; $7,000 res., St. Oliver St.

Toronto, Ont.

W. J. Bowen, 60 Gilbert Ave., res., Winnette Ave.; $6,500 1 pr. res., 90-2 Day Ave.; $5,500 res., 131 Caledonia Rd.

J. H. Harris, 683 St. Clair W., $9,000 res., Dunvegan Rd.

Moss & Stocks, 1145 Yonge St., $60,000 church, Willard Ave.

Salisbury Electric Co. Ltd., 112 King W., $75,000 church, Bloor St

NOTICE TO
Professional Engineers

The first general meeting of the Association of Professional Engineers of the Province of Ontario will be held at 96 King Street West, Toronto, at 7.30 p.m. on Monday, 8th January, 1923, for the purpose of electing a President, Vice-President, and Councillors, and for the transaction of general business. A register of the names of all members, elected up to 7th December, 1922, may be seen at the office of the Registrar.

On behalf of the Provisional Council of the Association.

R. B. Wolsey, Secretary

Qualified Professional Engineers are invited to make application for registration. A copy of the Professional Engineers Act, 1922, and other particulars will be sent on request.

DON'T TAKE CHANCES

Use MacLean Building Reports and secure accurate advance information on every building and engineering contract in your territory.

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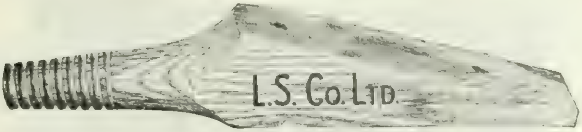

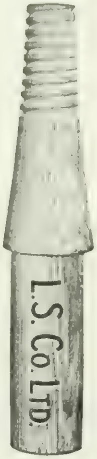

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TOP PINS, SIDE BRACKETS, POLE STEPS AND CROSS ARMS

We have been supplying this pole line material for years, from coast to coast, to the largest telephone, telegraph and electric lighting systems.

Our goods are specified where efficiency and economy are measured by actual results and not by purchase price only.

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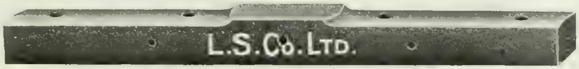

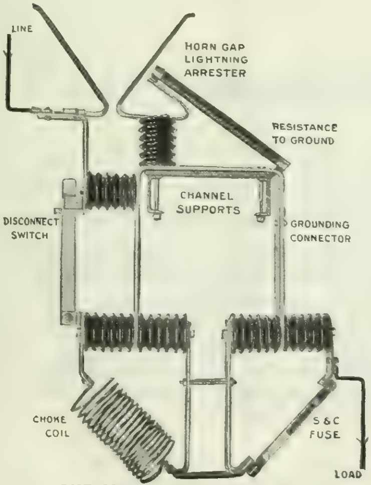

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Horn Gap Arrester with Series Resistance to Ground, Disconnecting Switch, Choke Coil and "S & C FUSE" Mounting.

Simplified Substations with Complete Protection

for small and moderate loads for Rural Service, Small Towns, Industrial plants. etc.

The Economy and Simplicity of these Compact Assembled Units is at once apparent.

They are made in single pole, two pole and three pole combinations mounted on galvanized structural steel supports ready for your poles, with or without rod for operating switches from the ground.

7500-15000-25000-37000 Volt Service

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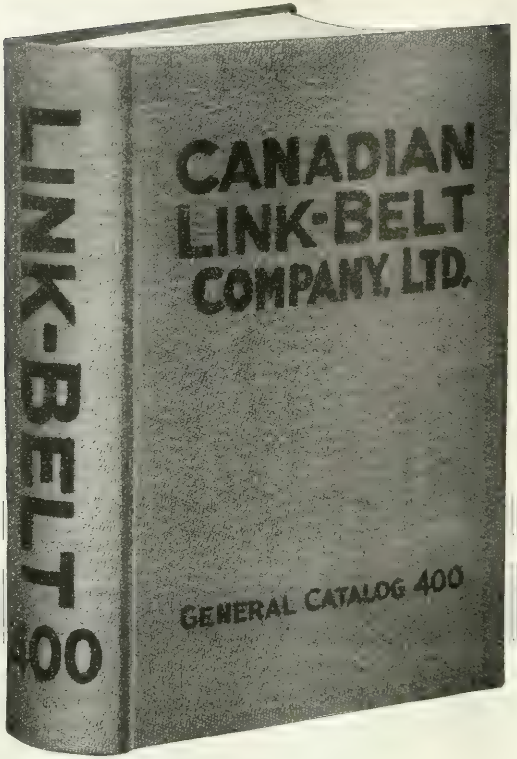
SCHWEITZER S&C CONRAD, INC.
4435 RAVENSWOOD AVENUE CHICAGO, ILLINOIS USA



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THE new Link-Belt General Catalog No. 400 contains 832 pages of practical mechanical information on elevating, conveying and power transmitting machinery and accessories — chains, sprocket wheels, buckets, gears, screw conveyors; in fact, it combines the complete Link-Belt products with those of our H. W. Caldwell & Son Co. plant, now owned by our Company.

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Engineers, architects, superintendents, purchasing agents, and those responsible for production, should have a copy. We shall be pleased to send the book to the right man in your organization, if it can be used to our mutual advantage. Address our nearest office, on your letterhead, giving your name and position.

CANADIAN LINK-BELT COMPANY, LIMITED 1063-A

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"Sooner or Later You'll be Buying

OUR J F **CONDUIT**

PIPE FITTINGS"

Why not finish up the old year right, ready to start 1923 anew.

Use J. F. Conduit Pipe Fittings. You'll find complete service and get better quality. No risk necessary; write and we'll gladly send a sample, free of charge.

Receive our handsome monthly blotter Free. A postal card will add your name to our mailing list.

Ferguson Mfg. Co., Limited
LONDON, ONTARIO
Phone 4436-W 174 King Street

Polyphase Meters

Type "C"—Bottom Terminals

We have a large stock of these meters which can be supplied with either clock or cyclometer type of dial, and in six terminal or seven terminal styles. The shunt leads are brought out to a separate terminal in the "Seven Terminal" meter, which isolates the Line Voltage from the current coils, thereby reducing chance of short-circuits between coils and coils and case.

Write for Special Prices on this stock

Ferranti Meter and Transformer Mfg. Co. Ltd.

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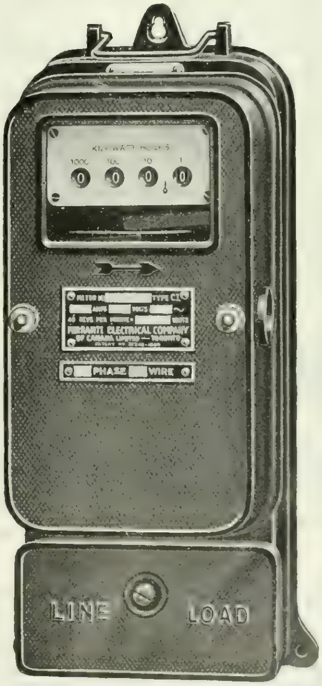

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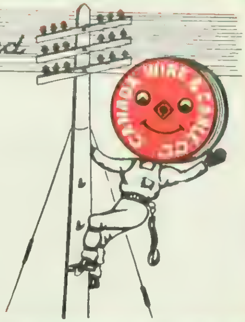
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DUST—
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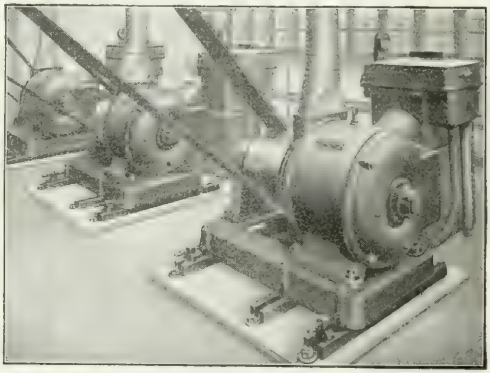

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Prices of Shades

Like every other sensible priced commodity

Are Coming Down

Why not get our fall line?
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STANDARD SILK SHADE CO
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Interior Telephones

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A complete new silent call system for hospitals. Registers at nurses' quarters and office with time record, if wanted.

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"Turn to the right and back comes your light"

with a

"Repeater-6" Fuse Plug

"Repeater-6" marks the greatest forward step in the history of fuse making. It can be used six times and then refilled at a cost of a few cents. When one fuse blows, simply turn the switch to the right and back comes the power or light.

"Repeater-6" is made in 7 amperages ranging from 6 to 30 and the voltage is 110 to 125.

You can obtain your requirements from the electrical jobber or by writing us direct.

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Repeater Six Fuse Plug Co.
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POWER DIRECTED

Man rules the world because he can direct power. First he learned to direct brutes so they would apply their strength to his tasks. Later, he discovered that he could use running water to turn wheels and so help him in his work. Then came steam and finally ELECTRICITY.

Modern man has found that of all the forces at his disposal Electricity is most useful because it can be directed wherever it is needed, whenever it is needed and in the required quantity.

In the direction of Electricity, O-B Insulators play a leading part. All over the world power is being directed, from the station where it is generated to the point where it is used, over wires supported safely, reliably by O-B Insulators.

O-B Designs *Improve* the Lines

The Ohio Brass Co.
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Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

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SAFETY MOTOR STARTERS

Type WK-10
For motors up to 2 H.P.

These well-known starters for starting small single phase and three-phase motors are approved by the Board of Fire Underwriters and the H.E.P.C. 125-250-440-550 Volts A.C. They give long and efficient service.

Type WK-20
For motors up to 5 H.P.

Full Particulars on Request

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Canadian Drill & Electric Box Co., Limited

1402 Queen St. East, Toronto, Ontario Phone Gerr. 554

1922 We Wish You all the Season's Greetings **1923**

ELECTRICAL

FIXTURES, APPLIANCES —AND SUPPLIES—

We carry a full range of these lines on hand at all times and give prompt and careful attention to all orders and enquiries.

All our goods are standard and moderately priced. When you want service, order from us. Write, wire or phone today.

Acme Electric Supply Co.

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Canadian Drill & Electric Box Co. Limited

JEWELERS and dentists who have made the mistake of purchasing cheap, underpowered lathe motors, as well as those using foot-powered devices, are live prospects for the dealer who sells R & M dental lathe motors. The large capacity of the motor—1/6 horse-power—its quiet, vibration-free operation, sturdy construction and workmanlike appearance make an immediate appeal, and its price, power and quality considered, is usually an agreeable surprise to the prospective customer.

Each motor is supplied complete with cord and plug, chucks, grinding wheels and buffing wheels. In addition to its use for jewelers and dentists, it is a handy outfit for household service.

Jobbers and dealers have found this motor one of the very attractive items in the R & M line. Bulletin on request.

The Robbins & Myers Company of Canada, Limited

Brantford - Ontario

Robbins & Myers Motors

Sales Tripled this Year at Walkerville on Hoover Co-operative Plan

During 1921, in Walkerville, Ontario—a city of 2,955 wired homes—the Walkerville Hydro Electric System sold 86 Hoovers valued at $6,087.50.

During the first half of 1922, however, they sold 135 Hoovers worth $8,590.50! This is at the rate of about three times their last year's sales.

This Utility operates on the famous Hoover Co-operative Plan, as do so many other prominent retailers. Under this arrangement the trained Hoover sales organization—working closely with the dealer—secures leads, demonstrates, sells, delivers and services the cleaners.

A Hoover demonstrating table is placed on the aisle along which people must walk to pay their bills. Hoover window displays, Hoover advertising in local papers and special Hoover sales campaigns are also used to interest the public.

Why don't *you* take advantage of the long experience the Hoover organization has had in the successful sale of electric cleaners? Why don't *you* find out just what it can do to increase *your* business?

A representative will gladly call—without obligation. Send for him.

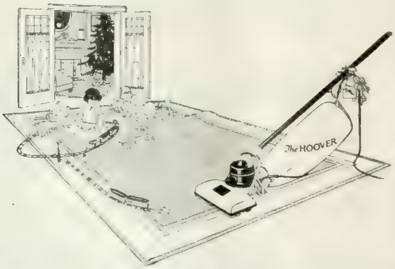
THE HOOVER SUCTION SWEEPER COMPANY OF CANADA, LIMITED
Factory and General Offices: Hamilton, Ontario

MEN WANTED
to sell The Hoover

The expansion of our business continually creates openings for alert, energetic young men of good character, appearance and address to be trained as retail Hoover salesmen. Many of our men

Earn $200 to $600 per month

The average runs $200 to $250 Some make $500 to $600, however. It is simply up to the man and how willing he is to be taught the best methods of selling. You sell the best known, best advertised and best cleaner. We train you free and pay you liberally. Excellent opportunities for promotion. Apply in person at Hoover district offices in principal cities (consult phone book)—or by mail to factory. There may be an opening right in your locality.



The HOOVER

MADE IN CANADA

It BEATS ... as it Sweeps as it Cleans

Retail Marketing Tips

Washing Machines

—That will make you money

Start the Year 1923 Right

"SELL IN THE HOME"

There are a number of stores selling washing machines at the rate of one hundred and fifty a year.

That's three a week!

One machine every other day!

"How do you do it"? I asked one of the dealers.

"Intensive Cultivation" he replied. "I map out a definite field—not too large—and I cultivate it as carefully as I know how. I think many of our dealers make a mistake here."

"Will you outline your general plan?" I asked.

"Willingly! It's very simple—it's logical, that's all:—

(1) I prepare a hand-picked mailing list of 100 prospects, including my best customers.

(2) I notify them that on a certain date I shall give a demonstration in my store—the demonstration to be in charge of a woman.

(3) The day before the demonstration I either call these prospects on the telephone—or have an assistant do it—simply as a reminder. Incidentally, this frequently gives me a line on the prospect's attitude of mind.

(4) During the demonstration I have two main thoughts in mind:

(a) Sell the machine, or

(b) Arrange for a home demonstration.

(5) Immediately following the demonstration I begin my intensive work. Every prospect is seen in her home. A card record is kept of each interview.

(6) A month later, if I can make the rounds, I see my prospects again. I never let more than two months elapse.

(7) When I sell a machine, another new prospect is added, so that I always keep 100 on my list.

(8) Though my main purpose in this campaign is to sell washing machines, I incidentally sell many other electrical appliances without any extra effort."

"You consider it necessary to get right into the homes of your customers in order to get best results?" I inquired.

"Without the slightest question" replied this dealer. "My slogan is 'Sell in the Home.' No other form of effort the dealer can make will be nearly as effective."

Sales Are Closed at Demonstrations

If the Man of the House Had to do the Washing———

By F. S. BABCOCK

At Toronto Contractor-Dealer Convention

If possible close the sale during demonstration

I have no volume of statistics on selling electric washers—just a few ideas. They are not all original but there are some that **you** may absorb and incorporate into individual businesses. With today's high pressure of business methods and high priced merchandise it is easier to sell washing machines than ever before. It is being done over the length and breadth of the land and money is being made by the contractor-dealer.

It does not matter whether it is wiring, stores, vacuum cleaners, fixtures or washing machine, it is the profit you make on what you sell by which you judge what success you are having. Therefore one of the first items in the better selling of washing machines is the choosing of the washer you will sell. There are many angles to consider, (1) It it a long established line? (2) Is it well advertised? (3) Is it efficient? (4) Is it durable? (5) Is it convenient? (6) Is it pleasing to the eye, and will it create business itself? (7) Is the margin sufficient to warrant an effort being put into the sale of the particular washer you may be considering? (8) Is the sales resistance high? Get sold, allow someone to sell **you** some washer. Take each item up separately.

Keep Your Stock Clean

Then the care of your stock—the washing machine in your show room should be cleaned and dusted. Especially is this so of the glass tank for special demonstration. These washers are supplied at considerable cost by the several manufacturers and if kept clean they are a distinct asset both to the manufacturer and the dealer. If allowed to become dirty inside and out they are, by the same token, a very distinct liability. It is a pleasure to go into a shop and find a demonstrating machine clean and tidy. I know I have a good dealer there for he values the special tank and is cashing in on it. Keep your washing machine clear of other merchandise so that when a customer for lamps or fuses comes in you can suggest her looking at your favorite washing machine.

Never suggest her **buying** a washer. Immediately this is done you have built up a wall of resistance that will take a very great amount of tact to remove.

These casual customers are sometimes developed into the best mediums for putting your message across. Be nice to them, give them circulars, etc., and look upon them as a crop to be gathered in the future.

Interest Friends of Your Customer

In regard to getting prospects, I would suggest that you do your utmost to get the friends of any customer into her house to see a demonstration. Then is your chance to pave the way for many more sales. Of course, there must be no loophole for any mishaps in this demonstration; have everything ready so there can be no mistakes. House to house canvassing is a good way to get prospects, but it is easier to create them from those already sold.

It is, of course, well known to you that most sales are closed at the demonstrations. This is the easiest time to do it and always arrange proceedings with that idea in mind.

The competitive demonstration is something that is not generally good business. It may happen sometimes that the customer says she is not quite satisfied with the machine she has—then, of course, it is up to you to go in and win.

A Word About "Service"

I want to say a word about service. This is a very important part of the business of selling electric washing machines. It pays to call around a month after you have placed a machine to see how it is working. You can train salesmen to do a little servicing in this way. That sort of procedure shows the customer that you are really interested in the machine, and makes her boost for you and your machine.

No Mention of Price

In the actual sales argument the question of price should have no consideration. Show the woman what the washer will do for her, how many more leisure hours it will give her, what additional happiness it will mean in the home. Get the women to pity themselves—show them how hard worked they are with the old rub-board. There is one little saying that is very effective "If a man had to do the washing, no home would be without an electric washer."

The way to sell people who do not do their own work is to show them that the machine is a good investment. When an actual saving is demonstrated to them, and they see how wasteful of money and energy the old style hand washing is, they are as easy to sell as the women who does her own washing.

Sell on Instalment Plan

I favor a 30 or 90 day instalment plan as the best way of selling washers. The whole thing is a question of salesmanship. In the same way, it is often possible to sell a machine, with the privilege of using it for only one washing, instead of the long free trials advocated by some. Washing machines are a line that pay the man who puts brains and energy into selling them.

Get the neighbors to come in.

—and still the demand increases

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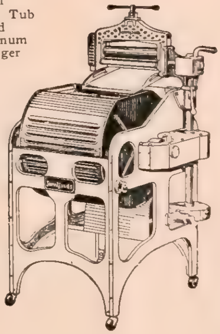

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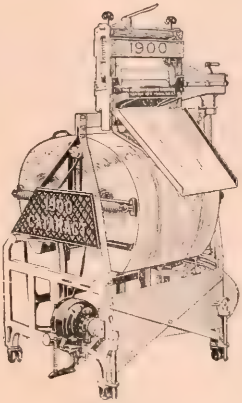

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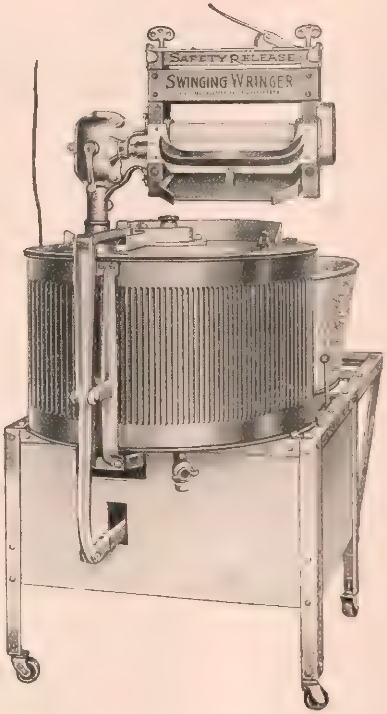

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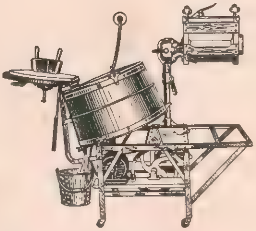

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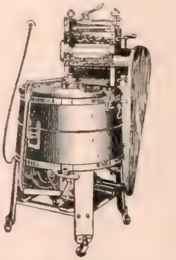

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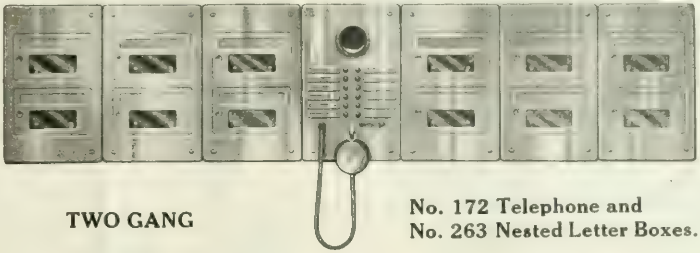

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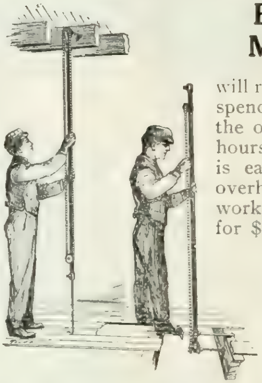

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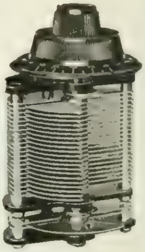

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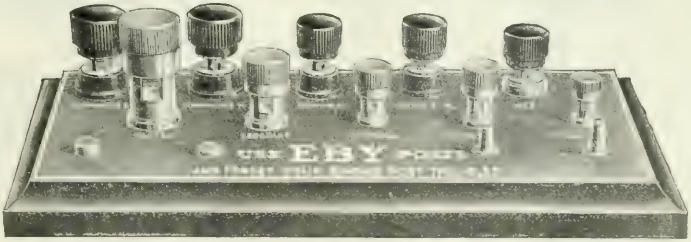

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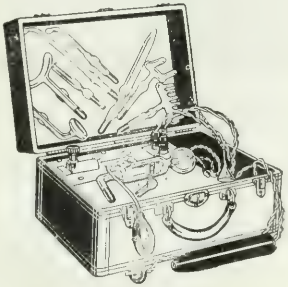

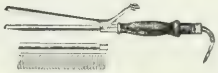

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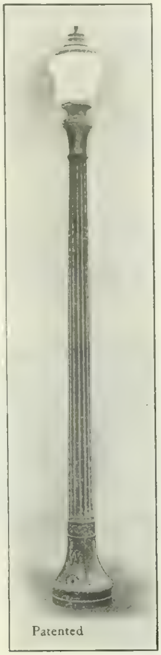

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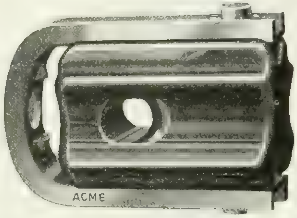

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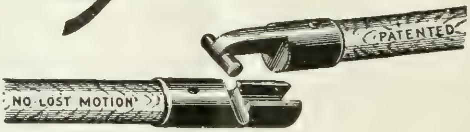

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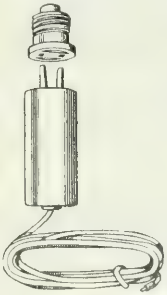

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we wish

A Very Merry Xmas

and a

Bright Prosperous
New Year

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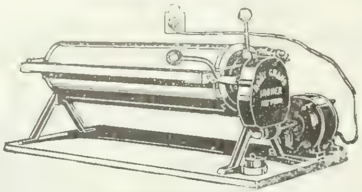

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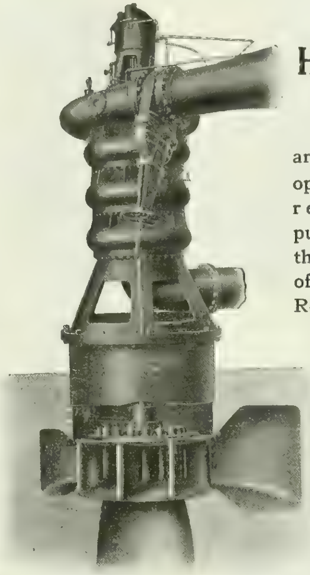

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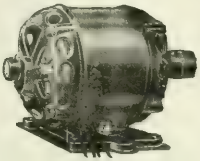

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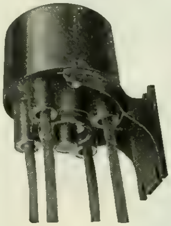

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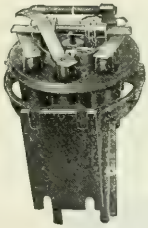

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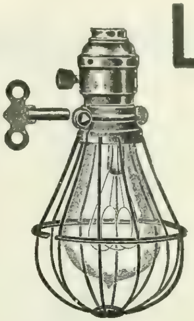

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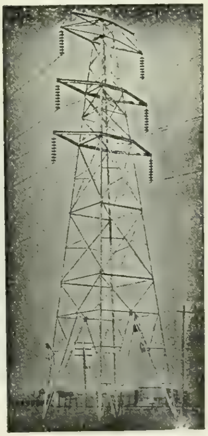

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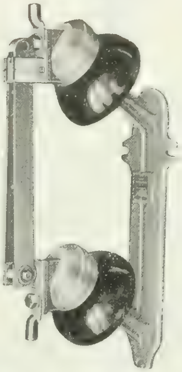
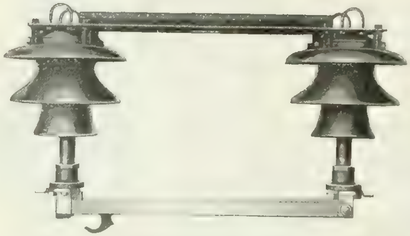
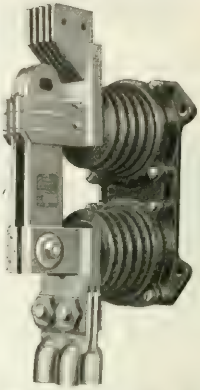


600 A. 15,000 V. Type "MH"
Vertical Mounting Switch



300 Amps. 45,000 Volts Type "K" Inverted mounting
Disconnecting Switch



2,000 A 7,500 V. Type "H"
Switch with special break jaw, terminal block for strap connection

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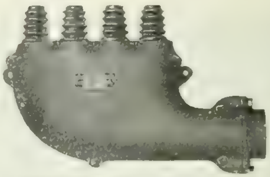
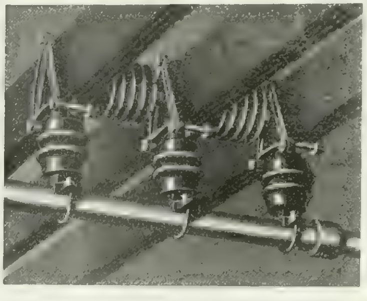
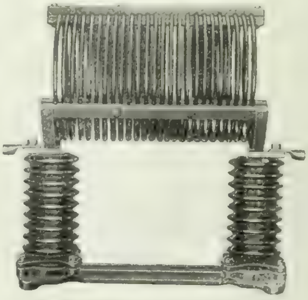


Westinghouse Split Pothead Type D

33,000 V. Type "H"
Expulsion Fuse Block



Type "H" Bus Bar Supports



200 A. 22,000 V. Type H Choke Coil

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